the OIL AND GAS JOURNAL

THIS BOX* holds TONG DIES protected TWO WAYS against wear

**ONE—BJ Tong Dies have a *super-hard outer case* for positive grip on the hardest joints . . .**

**TWO—BJ Tong Dies have a *tough, ductile core* to absorb shock and prevent breakage . . .**

BJ Engineered Tong Dies give the *most* possible wear . . . you use *fewer* dies—you make *fewer* die changes. Remember—tong dies are the hardest working tools on your rig—they make and break every stand joint on every trip. That's why you need the *extra* protection of tough, long-wearing BJ dies.

*Every box of BJ Tong Dies contains *all necessary* parts for quick, trouble-free die installation—an extra time-saving convenience for your crews.

*Specify BJ on your next tong die order.* Look for the identifying initials "BJ" stamped on every die. Made in all types for all tongs. Ask your BJ Representative—or your nearest field supply store today.

BJ MEANS ENGINEERED OIL TOOLS

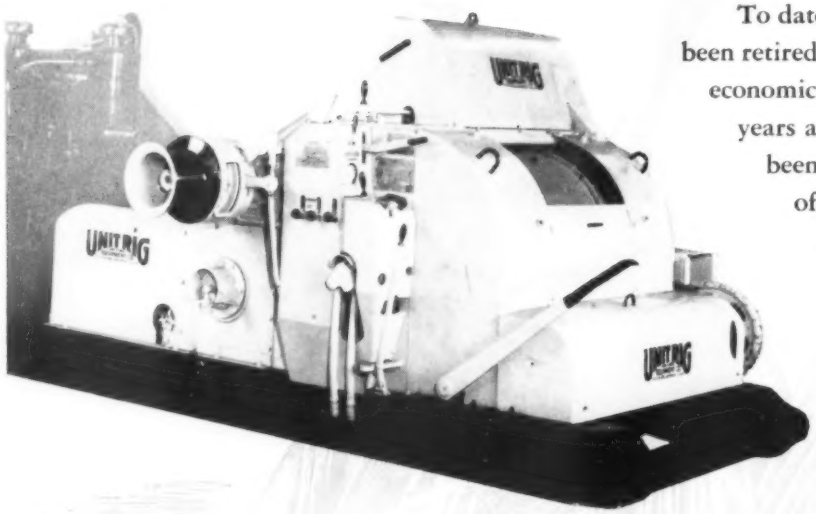
Byron Jackson Co.
Since 1872
MAIN OFFICE & PLANT: LOS ANGELES 54, CALIF.
Mid-Continent Office & Plant: Houston 1, Texas
Export Office: New York 17, New York
JOBBERS IN ALL PRINCIPAL OIL FIELDS

**BJ TONG DIES ARE REVERSIBLE...WEAR LONGER...AND ARE THE MOST ECONOMICAL DIES AVAILABLE!**


**PRICE 50 CENTS** TABLE OF CONTENTS PAGE 119 **FEBRUARY 22, 1951**

# HOW LONG SHOULD A DRAWWORKS LAST?

How long a drawworks should last, depends, of course, upon how much it is used, and what kind of care it has had. For fifteen years Unit Rig has kept track of the Unit Rig drawworks sold. The record of performance and long life of these units gives some idea how long a Unit Rig drawworks will last under average conditions.




To date only ONE Unit Rig model has been retired because it was worn out beyond economical repair. This is after fifteen years and after hundreds of units have been put into operation. This record of performance proves why Unit Rig users reorder Unit Rig equipment time and again.

*Make your next drawworks a UNIT RIG.*

UNIT RIG & EQUIPMENT CO.
TULSA, OKLAHOMA U.S.A.

DESIGNED FOR THE JOB...

UR-511

*UNIT RIG DRAWWORKS ARE SOLD EXCLUSIVELY THROUGH AUTHORIZED DISTRIBUTORS*

Walworth manufactures a *complete line* of Gate, Globe, Angle, Check, and Lubricated Plug Valves, made of Stainless Steel, Steel, Iron, Bronze, and Special Alloys in a wide range of sizes and temperature-pressure ratings.

Fittings of steel, iron, and bronze are also manufactured in all conventional types and sizes.

**WALWORTH**

**valves and fittings**

**60 East 42nd Street, New York 17, N. Y.**

Distributors in principal centers throughout the world

The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1951.

# SERVICE RECORD — *Outstanding!*

# SERVICING RECORD — — — *ditto!*

This Fairbanks-Morse ZC Engine boasts a remarkable record. After 10 years of operation, it is still going strong *with no overhaul required.* It ran 24 hours a day for 6 years and 12 hours a day for 2 years. Engine upkeep has amounted only to routine valve grinding. Crank case oil was changed every 30 days.

This record for service and *servicing* is typical of the Fairbanks-Morse ZC . . . is one of the reasons why they are the oil field favorites. See them at your supply store or write Fairbanks, Morse & Co., Chicago 5, Ill.

**FAIRBANKS-MORSE,**

***a name worth remembering***

OIL FIELD EQUIPMENT • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • PUMPS • SCALES • HOME WATER SERVICE EQUIPMENT • RAIL CARS • FARM MACHINERY

# medium loads from any depth

# ..call for TYPE "L"!

SAFE THAN SORRY
GUIBERSON
BETTER BE

REG. U. S. PAT. OFF.

## FINEST TUBING SWAB CUP MADE FOR LIFTING MEDIUM LOADS FROM DEEP WELLS

When you're swabbing from any depth and you want to lift every drop of fluid, no swab cup on the market can do a better, more efficient job than the Guiberson Type "L" on the conventional Guiberson "K" swab. This unbeatable combination drops fast and seals perfectly for the lift—and has the flexibility and durability to do a top-notch job. Look for the "L" cup at your favorite supply store, packaged in pairs in the brilliant blue box.

For complete information about the "L" cup and other Guiberson cups, swabs and equipment, ask your Guiberson representative or write direct.

***SOLD BY LEADING OIL FIELD SUPPLY STORES EVERYWHERE***

Established 1919

THE GUIBERSON CORPORATION

Dallas, Texas U. S. A.

# CUT PUMPING COSTS
## with AMERICAN Units

Contact your favorite supply store or the nearest American office NOW.

You can make those next pumping units you buy pay for themselves quicker if you will specify AMERICANS. American Pumping Units are engineered specifically to give longer service with less servicing. Structures and speed reducers conform to A. P. I. Specifications.

Operators' experience over the past 15 years shows that it costs less to pump with American Units, because Americans pump efficiently and require a minimum of maintenance. Check with any pumper who uses American Units. He will likely tell you that Americans are saving him money.

*26th Year*

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**Odessa, Texas, P. O. Box 983, Phone 3472**
**New York, N. Y., 500 Fifth Ave., Ph. LA. 4-4857**

**AMERICAN MANUFACTURING COMPANY OF TEXAS**
**FORT WORTH, TEXAS PHONE 6-3301**

# Use BREWSTER Drawworks

## To see you through 'till '62—and longer.

**Brewster rigs will see you through the years ahead with cheaper drilling to any depth.**

**DESIGNED FOR HARD WORK—BUILT TO LAST**

You can drill fast with them—haul 'em around—rig up in a hurry—and get miles of hole without a lot of maintenance work or replacement of parts.

They're tough. They have big bearings—big shafts—big bolts—big cap screws and heavy plate housings. The rigid frames hold shafts in alignment even with rough treatment—and the careful balancing of parts reduces vibration. Oil circulation systems on the larger rigs assure complete lubrication and cooling. *That's why Brewster rigs will see you through 'til '62—and longer.*

*Watch for the announcement*
**of Brewster's newest drawworks for 6,000' drilling**

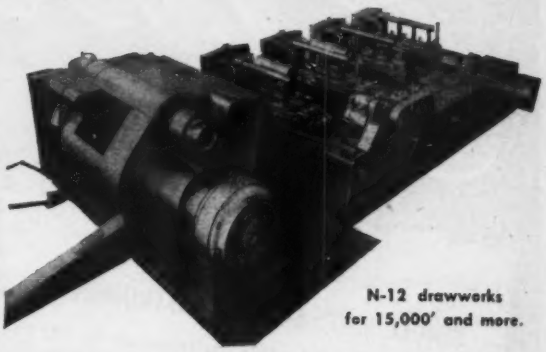
**—and Brewster rigs use standard makes of replacement parts, available in a hurry from your own supply store or from Brewster's large stock.**

*Ask these supply companies for Brewster drilling equipment:*

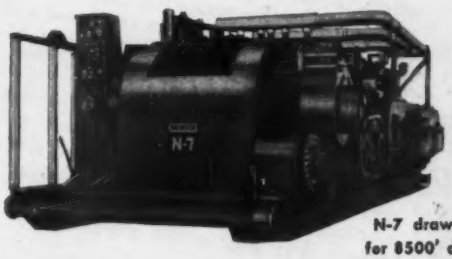
**Apex Equipment Company**
**Bovaird Supply Company**
**Industrial Supply Company**
**Murray Brooks, Inc.**
**Reams Supply Co.**

*In Canada:* **Rocky Mountain Supply Co.**
**Direct and through recognized export dealers.**

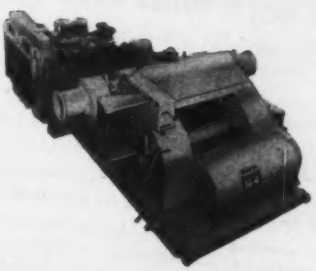
*Write today for the new pocket size catalog, giving full details on Brewster Drilling Equipment.*



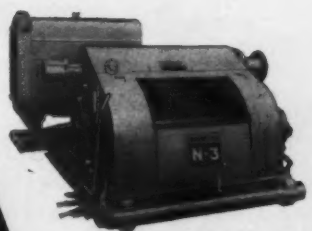
**N-12 drawworks for 15,000' and more.**




**N-7 drawworks for 8500' drilling.**



**N-4 drawworks for 5000' drilling.**




**N-3 drawworks for 3500' drilling.**

BREWSTER DRILLING EQUIPMENT

*Manufacturers of drilling equipment since 1910*

**THE BREWSTER COMPANY, INC., SHREVEPORT, LA.**

THESE FAMOUS

# Eastman

OIL WELL SURVEY

INSTRUMENTS

FOR RENT

## SINGLE SHOT SURVEY INSTRUMENTS

**REGULAR TYPE**—This instrument is favored because of its simplicity of operation. The Drilling crew can load, unload, and develop the recording discs in daylight. The discs are easy to read and simple to interpret. It is the most dependable survey instrument available.

**SMALL TYPE**—This instrument is used with retractable coring equipment, with non-magnetic drill collars, or special trigger bits. Its use results in substantial savings in rig time. The operation is identical to that of the regular type instrument.

## THESE INSTRUMENTS ARE USED—

1. On all directional drilling operations for checking the course of the well.
2. To accurately record the course of the well as it is drilled in order to straighten the bore if necessary.
3. As a means of securing information to insure correct bottom hole spacing on the lease.
4. For determining the correct location of all points in the well in reference to the geological structure.
5. In orienting cores to correct for the true drift and deviation of the well bore.

## DRIFT INDICATORS

**TYPE "W" DRIFT INDICATORS**—The Type "W" is a mechanical instrument which eliminates the use of batteries, lightbulbs, and photosensitive discs. The instrument incorporates a patented self-checking design which enables it to make two recordings. This feature insures that an incorrect reading will not be accepted.

**TYPE "M" DRIFT INDICATOR**—This instrument records photographically. Due to the length of the exposure necessary to make a recording, the operator is assured of a true reading. If the instrument's plumb bob is in motion, no record is obtained.

## THESE INSTRUMENTS ARE USED—

1. To determine that the well is drilled within the drift limits specified in the contract.
2. As an assurance that there are no "doglegs" left in a straight well after it is drilled.
3. For economy. They are the most inexpensive straight-hole surveying instruments available.

In drilling a well on a flat structure to assure that the hole is moderately straight. After drilling is completed a Multiple Shot Survey is run to determine the exact course of the well.

**CALL THE EASTMAN MAN NEAREST YOU!**

*(Consult Your Telephone Directory)*

EASTMAN OFFERS YOU DEPENDABLE INSTRUMENTS, SERVICE AND RESULTS

*These instruments are rented to operators and drilling contractors, complete with supplies and accessories. Frequent calls are made at the well by Eastman Service Men to insure satisfactory operation of the equipment.*

SEE OUR CATALOG IN THE COMPOSITE CATALOG

**EASTMAN OIL WELL SURVEY COMPANY**

LONG BEACH DENVER HOUSTON

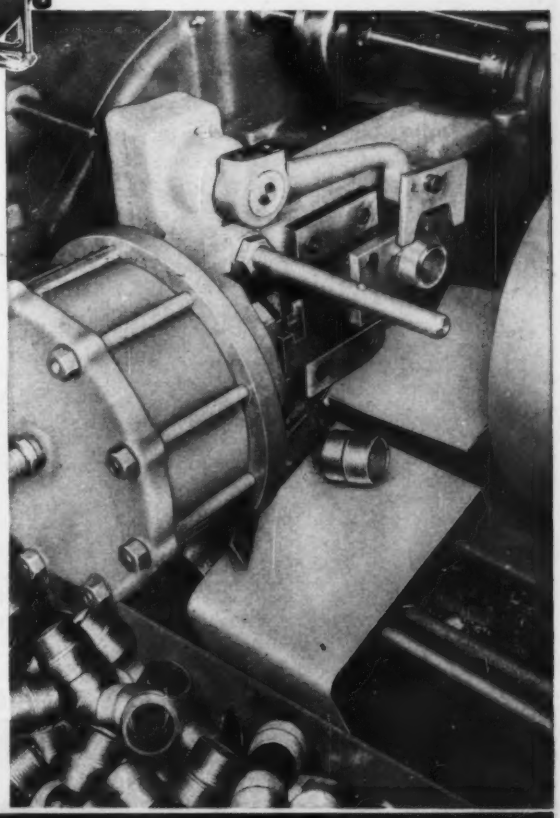
XUM

XUM

# A REVOLUTIONARY NEW DEVELOPMENT

## CLOSE & SHORT NIPPLES ... threaded in one automatic operation

Formerly the production of close and short nipples was featured by high labor cost, low output and tedious manual handling. NOW . . . here is a modern machine tool which mass-produces these nipples in a single continuous automatic operation.



The LANDIS Automatic Close Nipple Threading Machine, recently perfected by Landis Thread Engineers, will produce commercial standard close, short, and special short nipples at rates ranging up to 625 per hour. These machines are built in two size ranges—one for ½" to ¾" nipples—the other for 1" to 2" nipples.

This new LANDIS Close Nipple Machine is completely automatic—threading, reaming, and chamfering close nipples on both ends without secondary manual handling. Nipple blanks are fed from a magazine, transferred automatically from one carriage to the other, and ejected when finished.

Tremendous savings in labor cost can be realized—PLUS other savings through lower tool cost and increased production. The operator is required only to fill the magazine and give supervisory attention. Thus a SINGLE operator can handle TWO OR THREE LANDIS Close Nipple Machines, depending on the pipe size.

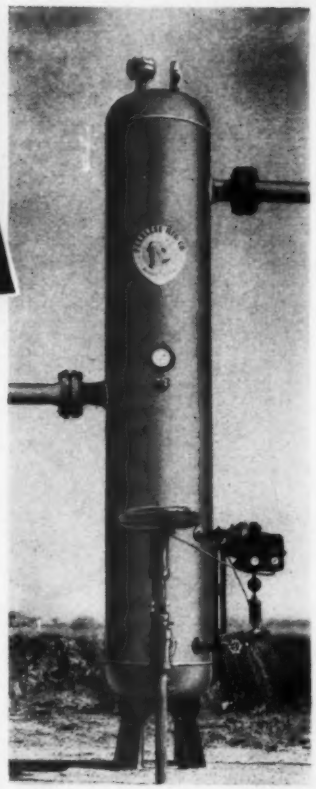
New construction features contribute to longer life and more efficient operation. Special built-in safety devices guard against damage from jams and ease the supervisory job of the operator. *Write today for complete information and specifications.*

**LANDIS *Machine* COMPANY · WAYNESBORO PENNSYLVANIA**

Represented in the Domestic Oil Fields by: Colcord-Wright Machinery & Supply Co., St. Louis, Mo.; C. J. Harter Machinery, Houston, Texas; Frederic-Baker Co., New Orleans, La.; Moore Machinery Co., Los Angeles and San Francisco, Calif.; Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

# PEERLESS GUARANTEES efficiency EFFICIENCY!

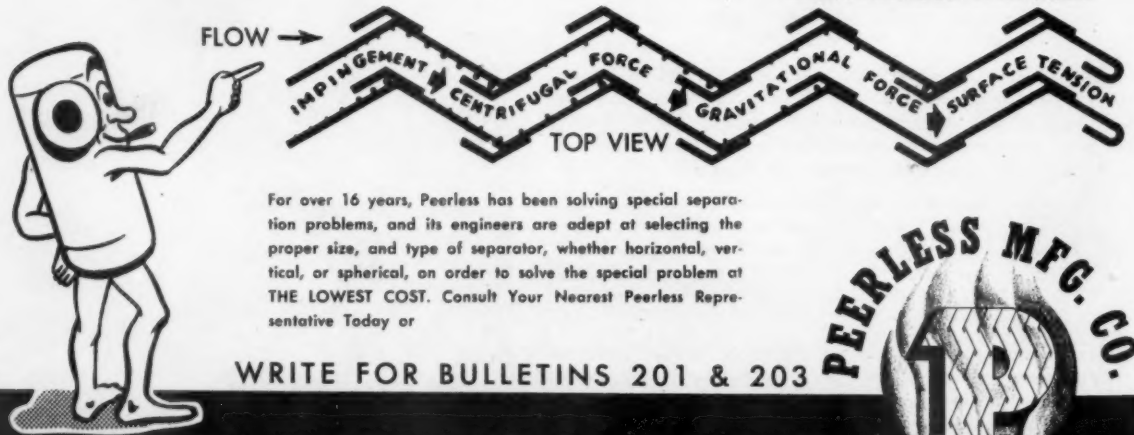
## PEERLESS HIGH PRESSURE OIL & GAS SEPARATORS



Peerless High Pressure Oil and Gas Separators are recognized for handling large volumes of gas and oil. In fact, they have proved capable of handling a greater gas volume than any other separator of comparable size.

This wonderful performance is largely due to the Patented Peerless Mist Extractor Unit—the HEART of every Peerless Separator! Peerless Mist Extractors combine impingement, centrifugal motion and surface tension to obtain their efficiency and to completely scrub all the liquid droplets out of the stream. Once the droplets are caught, it is impossible for them to get back in the gas stream.

The Mist Extractor Unit is so efficient Peerless GUARANTEES THE MECHANICAL LIQUID ENTRAINMENT LOSS TO BE LESS THAN 1/10 GALLON PER MILLION STANDARD CUBIC FEET.




For over 16 years, Peerless has been solving special separation problems, and its engineers are adept at selecting the proper size, and type of separator, whether horizontal, vertical, or spherical, on order to solve the special problem at THE LOWEST COST. Consult Your Nearest Peerless Representative Today or

WRITE FOR BULLETINS 201 & 203

PEERLESS MFG. CO.
DALLAS TEXAS

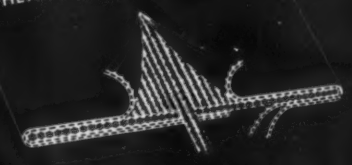
PEERLESS MANUFACTURING COMPANY
Walnut Hill Lane at Old Denton Road
P. O. Box 7193 DALLAS, TEXAS DI-8431

AGENTS IN:
Hobbs, N. M., Houston, Odessa, Wichita Falls, Alice, and El Paso, Texas. Tulsa, Denver, Philadelphia, Phoenix, Los Angeles, Boston, Cleveland, New York City, Buffalo, Chicago, Richmond, Louisville.

Service like this comes naturally when you turn to the G.T.M.—Goodyear Technical Man—for recommendations on Industrial Rubber Products. You can reach him through your nearest Goodyear Distributor, or by writing Goodyear, Akron 16, Ohio.

GOODYEAR INDUSTRIAL RUBBER PRODUCTS

G.T.M.-Specified COMPASS #1000 BELT for HEAVY-DUTY OIL WELL PUMPING



The COMPASS belt is bodied with multi-strand cords, spiraled continuously without a splice. Cords on opposite side of belt axis are twisted in opposite directions to insure true running.

**FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING** built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor.

Compass—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio.

# GOODYEAR

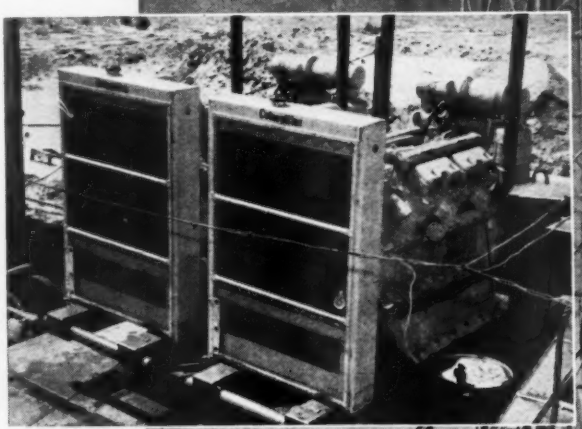
THE GREATEST NAME IN RUBBER

# A couple of new hands make good!

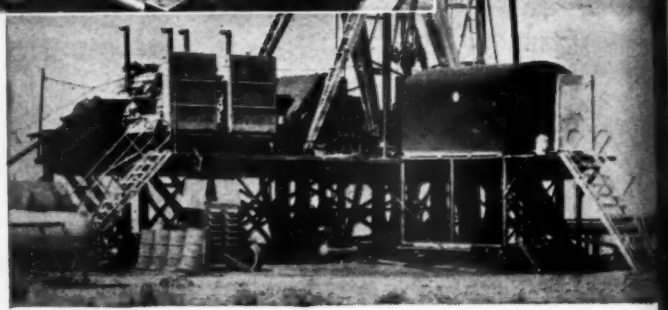
Typical of the reports coming in about 'Caterpillar's" big new Oilfield Engines is this one from W. B. Barnett, driller for the Western Drilling Co., Lubbock, Texas. He says: "For twenty-four-hour service, efficiency and ease of operation, the two D375 'Cat' Oilfield Engines we have are the best I have operated."

These two D375s are compounded to drive the Oil Well mud pump and Emsco drawworks on this 8,500-foot rig in operation at Whiteface, Texas. When this picture was taken, the hole was down to 4,400 feet, with 600 to go. Time-table for the setup: rig up, 10 days; drill, 13; complete, 16; tear down, 1.

"Cat" Oilfield Engines, in 10 sizes up to 500 HP., are designed for rugged oilfield duty. They're compact, yet they deliver plenty of power—their rating is honest. They're tough, built to stand up under the roughest rig service. And they're dependable, engineered to stay in there pitching with a minimum of down-time. For your electrical needs, "Caterpillar" Diesel Electric Sets are built in 10 sizes up to 314 KW.



There's another big plus for you when you use "Caterpillar" power. That's the on-the-job service from your "Caterpillar" dealer, on call day and night. His servicemen are skilled and his up-to-date shop is well stocked. Under current conditions, you'll find it well worth your while to talk over your requirements *now* with him.



## LOOK UNDER THE HIDE

**"Caterpillar" fuel lines are made of cold-drawn seamless steel tubing. All lines are the same length to give identical spray characteristics at each cylinder. Able to withstand pressures of 3,000 to 5,000 lbs. per sq. in., the metal is hard yet capable of being cold-formed without excessive spring-back. The bore is free of injurious cracks and seams and has uniform diameter. Look under the hide for built-in quality.**

**CATERPILLAR, PEORIA, ILLINOIS**

# CATERPILLAR

Reg. U. S. Pat. Off.

## OILFIELD ENGINES

XUM



XUM

XUM

XUM

XUM


**Worried about the effects of BLOCK DISTORTION?**

## Let Pedrick help you in this and other piston ring problems!

Block distortion, always a problem in engine design and maintenance, is perhaps more widespread than ever. Why? Repeated increases in compression and running temperatures, for one thing. And for another, there's a growing need for prolonged or uninterrupted operation. Conditions like these are bound to augment any tendencies toward distortion.

Pedrick, working closely with engine designers and operators, has helped solve this problem by providing rings with such lasting conformability that they prevent the blow-by and compression loss that usually appear when distortion begins.

Whatever your problem . . . compensation for distortion, lubrication of top cylinder areas, prevention of scuffing during break-in . . . you can count on Pedrick's help. With 31 years of concentration in the piston ring field, Pedrick has the specialized know-how to supplement your own experience. Address your inquiry to WILKENING MANUFACTURING Co., Philadelphia 42, Pa. *In Canada:* Wilkening Manufacturing Co. (Canada) Ltd., Toronto.

Pedrick®

"HEAT-SHAPED"

**PISTON RINGS**

FOR 31 YEARS, SUPPLIER OF PISTON RINGS TO LEADING VEHICLE AND ENGINE MANUFACTURERS



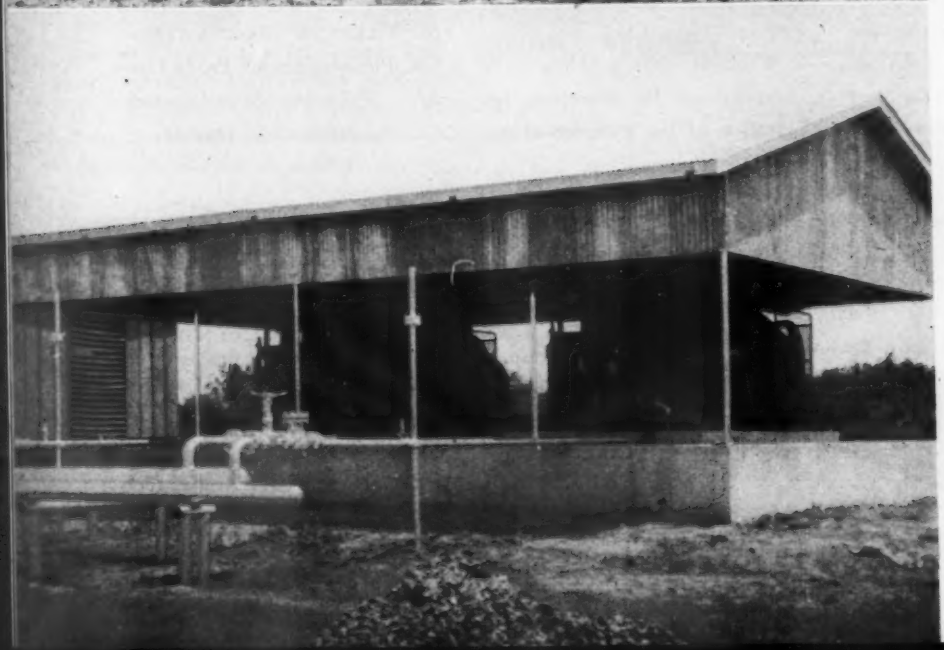

XUM

South Liberty Field Texas

2 - 75 Horse Power, "Two Stage" "Packaged" Portable Compressor Units.

Lafayette Louisiana

An 8" x 9" - 4¼" x 9" "Packaged" Portable Compressor Unit.



Refugio Texas

2-Size 8" x 9" - 4¼" x 9" "Packaged" Portable Compressor Units.

# ★ ★ ★ SERVICE ★ ★ ★

*A Most Important Feature of*

# WILSON SUPPLY—INGERSOLL-RAND

## *"Packaged"* PORTABLE COMPRESSORS

Do you need a "Packaged" Portable Compressor—a Booster—or a "Two Stage" unit? If you do—you need one that will not only *run,* but one that will keep on running—24 hours a day if necessary.

That is why KNOW HOW and SERVICE mean so much to Compressor Performance.

The Wilson Supply - Ingersoll-Rand "Packaged" Portable Compressors have proven over and over again in the field that they are manufactured and assembled by men who acquired their "Know How" thru many years of Gas Compressor experience. These Compressors are capable of working continuously for long periods of time with a minimum of maintenance costs.

Wilson Supply - Ingersoll-Rand Compressors do not require the constant attention of a skilled Compressor man. *However, should anything seriously go wrong—where a skilled man is required, one is available from the many advantageously located outlets of Wilson Supply Company and the Ingersoll-Rand Company.*

This availability of skilled service is further insurance that when you install a Wilson Supply - Ingersoll-Rand "Packaged" Portable Compressor—you are buying Compressor performance—not just a piece of equipment.

**STANDARD SIZES OF WILSON SUPPLY - INGERSOLL-RAND "PACKAGED" PORTABLE COMPRESSORS —**

1. **6" x 3¼" x 7" — 50 H.P. 20-Lb. Suction, 500-Lb. Discharge, 235,000 Cu. Ft. Per Day.**
2. **8" x 4¼" x 9" — 75 H.P., 20-Lb. Suction, 600-Lb. Discharge, 402,000 Cu. Ft. Per Day.**
3. **8" x 4⅛" x 9" — 75 H.P., 20-Lb. Suction, 700-Lb. Discharge, 382,000 Cu. Ft. Per Day.**
4. **7" x 4⅛" x 9" — 80 H.P., 40-Lb. Suction, 600-Lb. Discharge, 547,000 Cu. Ft. Per Day.**
5. **9" x 4¼" x 9" — 80 H.P., 10-Lb. Suction, 500-Lb. Discharge, 405,000 Cu. Ft. Per Day.**
6. **4⅛" x 9" — 45 H.P., 200-Lb. Suction, 600-Lb. Discharge, 630,000 Cu. Ft. Per Day.**
7. **3½" x 11" — 85 H.P., 800-Lb. Suction, 1750-Lb. Discharge, 1,792,000 Cu. Ft. Per Day.**
8. **5¾" x 13" — 117 H.P., 200-Lb. Suction, 700-Lb. Discharge, 1,600,000 Cu. Ft. Per Day.**

The eight sizes of Wilson Supply - Ingersoll-Rand "Packaged" Portable Compressors shown above represent but a few of the many machines now in service and on order.

The demand for this outstanding equipment is increasing every month—its economical operation and varied applications being recognized more and more by the Producing and Pipe Line Industries.

These machines are mounted on heavy skids and are completely assembled. They require only connecting of the suction and discharge lines to be put in operation. They are readily transportable by truck.

These "Packaged" Portable Compressors take the place of more costly, permanent installations—and afford a worthwhile saving on gathering lines.

These units can be furnished to meet specific requirements.

***Contact your nearest Wilson Supply Company Store or write "Compressor Division," Wilson Supply Company, P. O. Drawer 19, Houston, Texas, for detailed information, and quotations. Please give suction and discharge pressure and volume to be handled.***

# WILSON SUPPLY COMPANY

**BRANCH STORES**

**Texas — Alice, Corpus Christi, Victoria, Bay City, Columbus, Barbers Hill, Liberty, Beaumont, Kilgore, Monahans, Louisiana — Lake Charles, New Iberia, Houma, Harvey, Shreveport.**

**1412 Maury St.**
**HOUSTON**
**TEXAS**

***Sales Offices:***
**DALLAS, TEXAS**
**TULSA, OKLAHOMA**
**NEW ORLEANS, LA.**

# NOW ON MORE THAN 3000 TREES . . . BECAUSE

# O-C-T "JE" FLOW CONTROLS GIVE MORE FOR YOUR MONEY

When you can buy ***one piece of equipment at half the price*** that performs all the functions and takes the place of seven fittings in a conventional Christmas Tree wing, you certainly are getting more for your money. And that's exactly what O-C-T "JE" Flow Controls offer you ***without sacrificing safety or performance.***

Yes, this compact, easy-operating O-C-T "JE" Flow Control Unit . . . adaptable to either positive or adjustable chokes . . . performs the functions and takes the place of a wing valve, Christmas Tree cross or tee, adjustable or positive choke and the upper bottom hole pressure connection adapter. Besides, it eliminates the flange connections between the tee and the bottom hole test adapter, between the tee and the wing valve and between the wing valve and the choke. Thus, when used in place of a 10,000 lbs. test conventional wing, the O-C-T "JE" Flow Control Unit effects a cost saving ranging as high as 90%. In addition, it reduces weight as much as 70%, provides quick wing valve replacement, greater ease of operation at high pressures and easy field maintenance.

So don't be handicapped by habit. Investigate all the advantages and tremendous savings this remarkable O-C-T "JE" Flow Control offers you. Write today or ask your O-C-T Representative for details. All O-C-T equipment is available through recognized supply stores.

**Oil Center Tool Co.**

P. O. Box 3091, Houston, Texas

Canada — Canadian-Vickers, Montreal, Canada

Sterling Areas — Le Grand, Sutcliff & Gell, Ltd., Southall, Middlesex, England. Address Export inquiries for All Other Countries to P. O. Box 3091 Houston 1, Texas

"These Vulco Rope Drives have lasted through the drilling of seven wells of over 6,500 feet each," says John Rundle, tool pusher for Loffland Brothers, the operators of this big mechanical rig.

# This Simple Test Tells WHY the Concave Sides of Gates Vulco Ropes Mean *Longer Belt Life!*

**Prove this *yourself*—in two minutes' time.**

**Take any V-belt that has *straight* sides. *Bend* that V-belt while you grip its sides between your fingers and your thumb. You will *feel* the sides of the belt *bulge out*—as shown in figure 1-A, below.**

**Clearly, that outbulge forces the sides of the belt to press *unevenly* against the V-pulley—and this concentrates the *wear* where the bulge is greatest.**

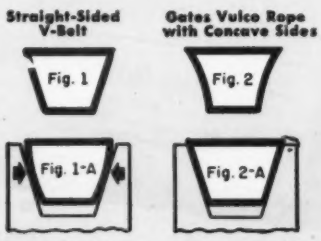
**Now, make the same test with the belt that is built with the Concave Sides—the Gates Vulco Rope.**

**Figures 2 and 2-A show clearly what happens when you bend a Vulco Rope. Instead of *bulging*, the precisely engineered Concave Sides merely *fill out* and become perfectly straight. There is no side-bulge. This belt, when bent, precisely fits its sheave groove.**

**Because there is *no bulging*, the sides of the Gates Vulco Rope always grip the *full* face of the V-pulley *evenly* and therefore wear *uniformly*—resulting in *longer belt life* and *lower belt costs for you.***

**Only V-belts made by Gates are built with concave sides. Whenever you buy V-belts, be sure that you get the V-belt with the Concave Sides—The Gates Vulco Rope!**

**What Happens When a V-Belt Bends**




How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill Out to a Precise Fit in the Sheave-Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

CS-511

THE GATES RUBBER COMPANY
DENVER, U. S. A.
*The World's Largest Makers of V-Belts*

Gates VULCO ROPE DRIVES
Engineering Officers and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

# WHAT has this Diesel got...?

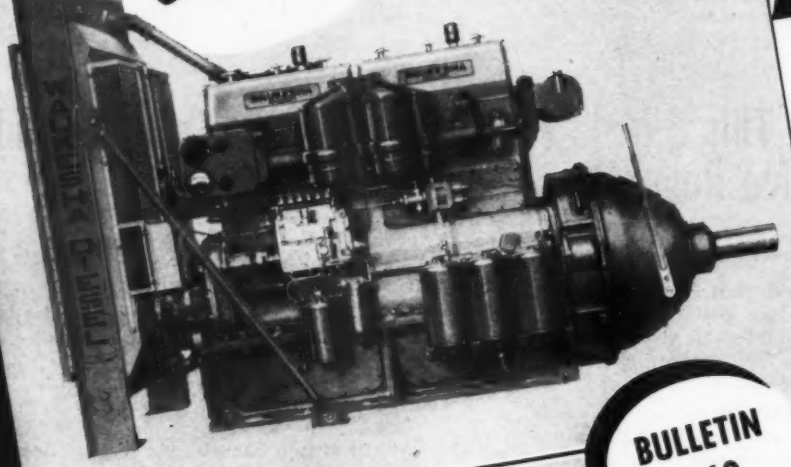
# PLENTY!

BULLETIN 1569 WILL TELL YOU

# WAUKESHA

MOGUL SIX POWER UNIT

6-NKDU Diesel



BULLETIN 1569

WAUKESHA MOTOR COMPANY • WAUKESHA, WIS.

Eastern Sales Office: Eight W. 40th St., New York 18, N. Y.
Mid-Continent Office: 703 S. Wheeling St., Tulsa 4, Okla.
Pacific Coast Office: 4927 Pacific Blvd., Los Angeles 58, Calif.

● High continuous net output—201 hp continuously at 1050 rpm—that's with all standard power unit accessories. And momentary overload is 272 hp at 1200 rpm. Waukesha's new Mogul Six is a full Diesel, four-cycle, solid injection. Six cylinders, 7-in. bore, 8¼-in. stroke, 1905 cu. in. displacement. Its unique patented combustion chamber cannot be had in any other American Diesel engine! That means smooth, clean, shock-free operation with high fuel economy. You can change over to natural gas, or vice versa, right in the field (there's a quick conversion kit for this). This Diesel unit has all "top drawer" mechanical features—lots of 'em—all interesting. New Bulletin 1569 tells you. Send for one. 110

**WAUKESHA**
**MOTOR COMPANY**
WAUKESHA, WISCONSIN
NEW YORK TULSA LOS ANGELES

These three Elliott Turbines are driving hot oil pumps in a new mid-west cat cracker installation. There are sixty-four in all in this plant.

# ELLIOTT YR TURBINES will fit in anywhere!

- Spark-proof and totally enclosed construction
- True centerline supports
- Readily removable packing cases
- Sealed bearings
- Sealed governor
- Balanced double-seated valves
- Economical liner type bearings

■ They hold every advantage of standardization, with the tailored-to-fit qualifications of a wide range of permissible modifications available on the basic design. These modifications include speed governors, pressure governors, auxiliary controls, location of exhaust, and in fact practically every major element which could be a factor in adapting the turbine to a specific set of conditions.

*Write us for fully descriptive bulletin H-16.*

**ELLIOTT COMPANY**
**STEAM TURBINE DEPT. • JEANNETTE, PA.**
Plants at: JEANNETTE, PA. • RIDGWAY, PA.
AMPERE, N. J. • SPRINGFIELD, O. • NEWARK, N. J.
*DISTRICT OFFICES IN PRINCIPAL CITIES*

H-731

**ELLIOTT**

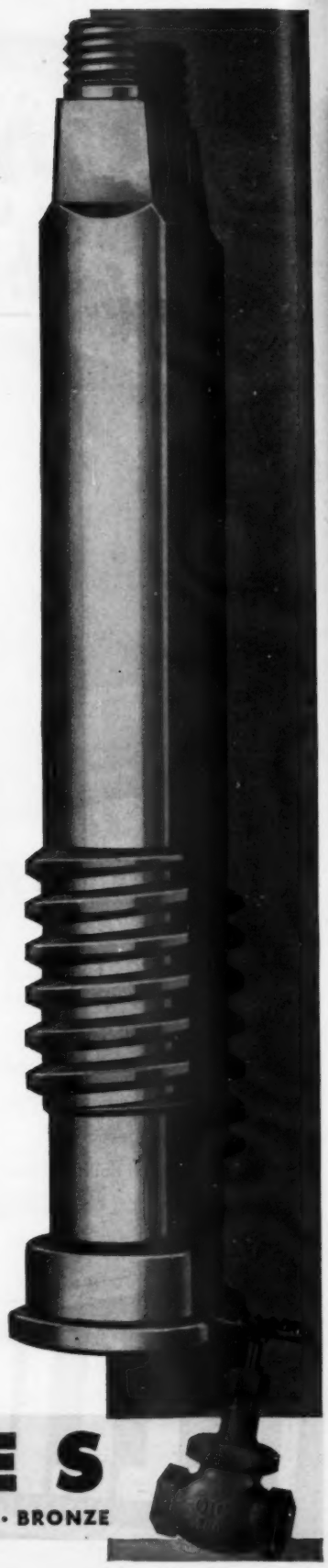
**...MECHANICAL DRIVE TURBINES are aces high in refineries!**



XUM

# THIS STEM WILL LAST LONGER

## because it's machined from OIC Alloy 40



Months ago, we introduced Alloy 40 to the field; use has confirmed our laboratory tests. Now, we are ready to tell you about it.

Alloy 40 completely eliminates galling and seizing. It is harder and stronger. It is highly resistant to attack by corrosive liquids and semisolids. It lasts longer!

*All* OIC Bronze Valves are now equipped with Alloy 40 stems. The Ohio Injector Company, Wadsworth, Ohio.

OIC
FOUNDED 1883

**VALVES**

**FORGED AND CAST STEEL · IRON · BRONZE**

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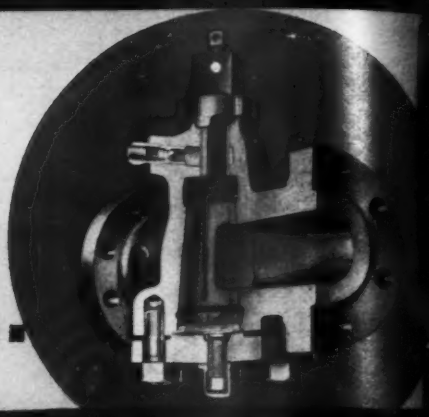
# SNAPSHOTS

## OF PETROLEUM SCIENCE AT WORK

**STEEL PLATE FABRICATORS AND ERECTORS SINCE 1913**

XUM

# There's One Valve...



## ...DRILLING MUD LIKE THIS

### ITS SEAT IS UNEXPOSED
### ITS INTERIOR IS HARD-FACED

Look at that drilling mud. Rub it between your fingers. Billions of grits that grind like an emery wheel. It stands to reason that ANY valve with an exposed seat quickly wears down to the leakage point—needing a costly replacement. But the Nordstrom lubricated valve defies mud attack. The plug is always seated. Automatic lubrication (with Hypermatic) polices the mud, preventing it from entering the seating surface. Pressurized lubrication seals each port. Then as an extra insurance of long life the plug and interior body surfaces are hard-faced with Merchrome coated—giving *file-hard* resistance to abrasion. You can count on from 5 to 10 times more valve life by installing Nordstrom—the *one* valve designed for the service.

NORDSTROM HYPRESEALS ON MUD PUMP MANIFOLD

Install Nordstroms on
Mud Suction Lines
Discharge Lines
Mud Guns
Stand Pipes

**KEEP UPKEEP DOWN**

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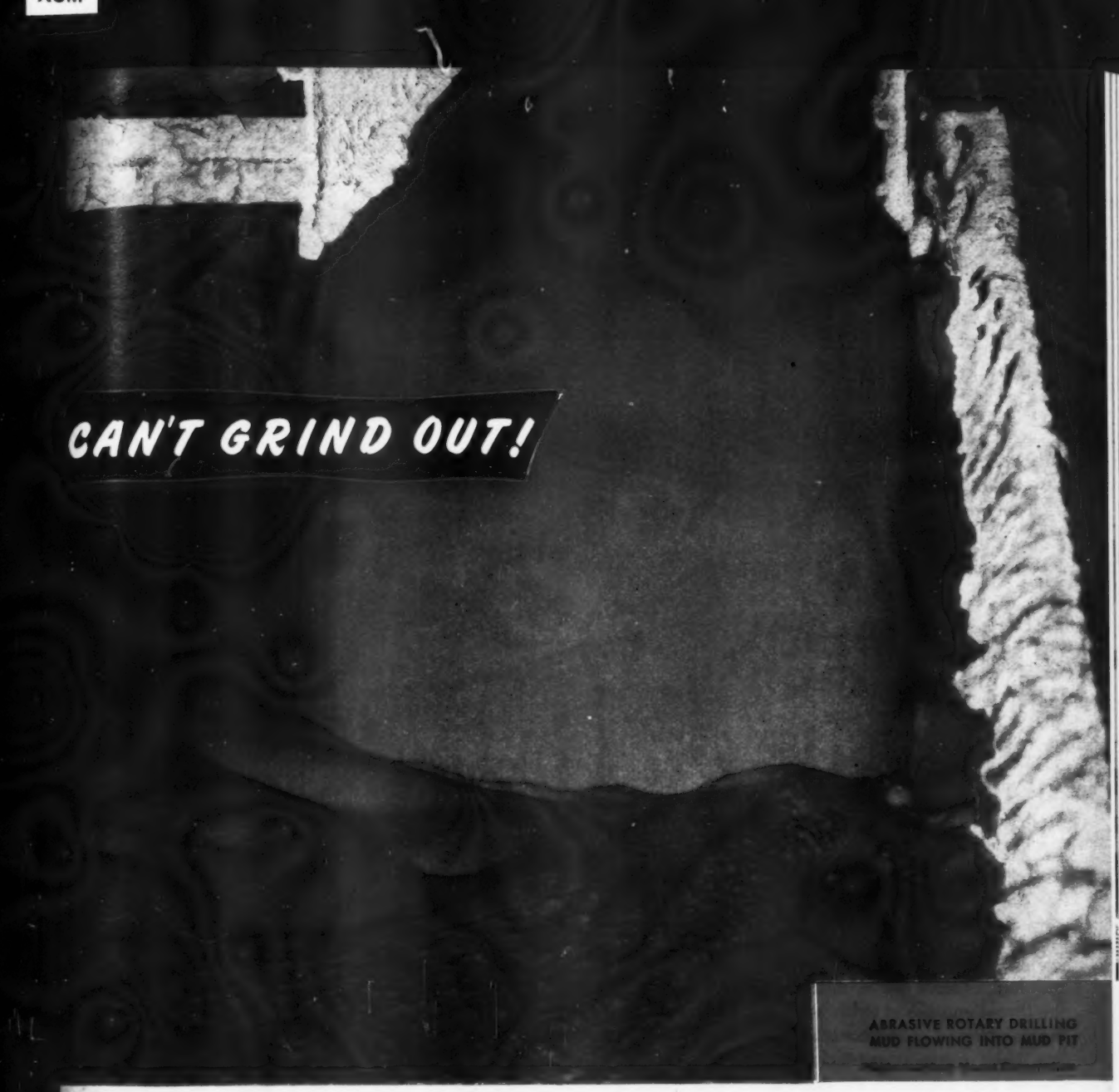



ABRASIVE ROTARY DRILLING
MUD FLOWING INTO MUD PIT

## 5 TO 10 TIMES LONGER VALVE LIFE

*You can prove to your own satisfaction the tremendously increased life of Nordstrom Merchrome coating mud line valves. Install one or several on the same lines where competitive valves are used. Compare length of life, ease of operation, freedom from leakage. You be the judge. Replace every worn valve with a Nordstrom.*

# Nordstrom Valves

**NOW AUTOMATICALLY LUBRICATED WITH** Hypermatic TRADE MARK

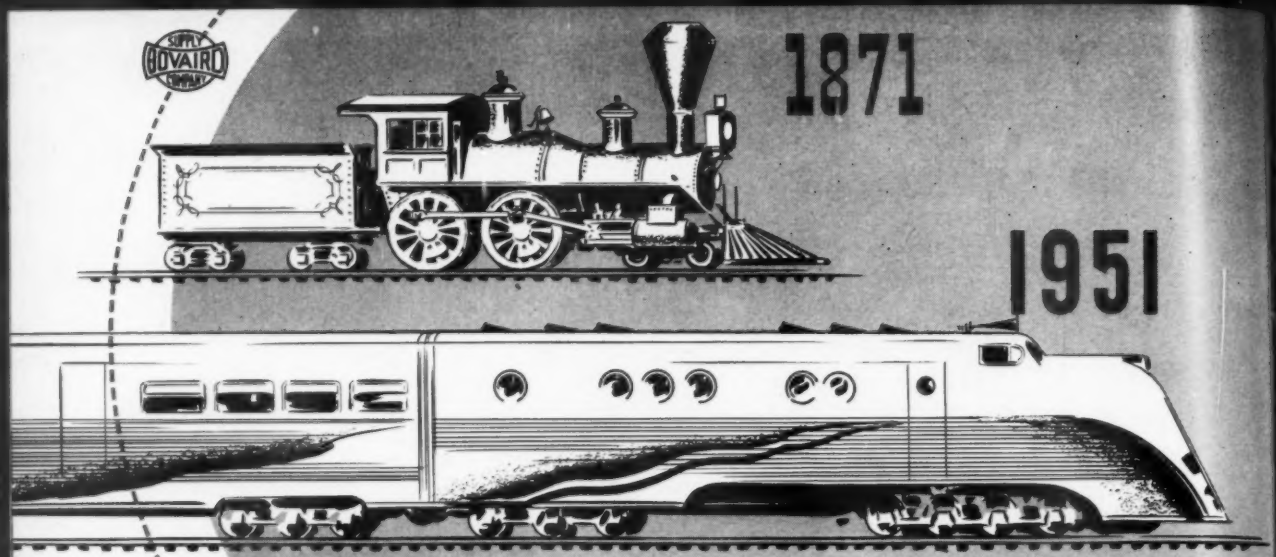
PATENTS APPLIED FOR

**ROCKWELL MANUFACTURING COMPANY**

400 North Lexington Avenue • Pittsburgh 8, Pennsylvania

Atlanta, Boston, Chicago, Columbus, Houston, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco, Seattle, Tulsa . . . and leading Supply Houses. Export: International Division, Rockwell Manufacturing Company, 7701 Empire State Bldg., New York 1, N. Y.

XUM




# Progressing Together

## With Petroleum

From lubrication for the first wood and coal-burning locomotives to modern motor fuel for the Diesel engines of today's streamlined trains, the growth and progress of the railroad industry has been made possible largely through the growth and advancement of your industry—oil.

Bovaird is happy to have contributed to the oil industry as a pioneer in the oil field supply business. Through wars and peace—depressions and prosperity—for 80 years Bovaird has been privileged to give consistent, helpful service as its part in furthering petroleum progress.

SUPPLY BOVAIRD COMPANY

**OFFICES AND STORES**
ILLINOIS—Clay City, Grayville, Salem
KANSAS—Chase, Great Bend, McPherson, Pratt, Russell, Wichita
OKLAHOMA—Duncan, Oklahoma City, Pauls Valley, Ringwood, Sapulpa, Seminole, Tulsa
TEXAS—Borger, Dallas, Midland, Odessa, Pampa, Snyder

"Buy From Bovaird"

THE Bovaird SUPPLY COMPANY
GENERAL OFFICES
TULSA, OKLAHOMA

80 YEARS OF PROGRESS WITH THE OIL INDUSTRY

# Power-Factor Improved 25%

At left, cutaway of a Twin Disc HYDRO-SHEAVE DRIVE.

## with an easy-attached Twin Disc HYDRO-SHEAVE DRIVE

A HYDRO-SHEAVE DRIVE is easily attached in a few minutes, mounts in the normal sheave position.

By replacing the ordinary pulley on your pump drive with a Twin Disc HYDRO-SHEAVE you can immeasurably improve the performance of your electric motor.

The *smooth* pick-up of the HYDRO-SHEAVE, so characteristic of all Twin Disc hydraulic units, knocks down the peak wattage demand by an electric motor, to nearer the running load. One test indicated that peak wattage was reduced from 3,000 watts with an ordinary drive to only 2,000 with a HYDRO-SHEAVE Drive.

On another installation, the power-factor was increased from .626 to .748 under running conditions—an improvement of 25%. And this smoothness is reflected throughout the entire mechanism. Stresses and strains in gear box and polish rods are reduced. Motor speeds remain nearer constant and the "slip" of the HYDRO-SHEAVE keeps high peak surges off the line.

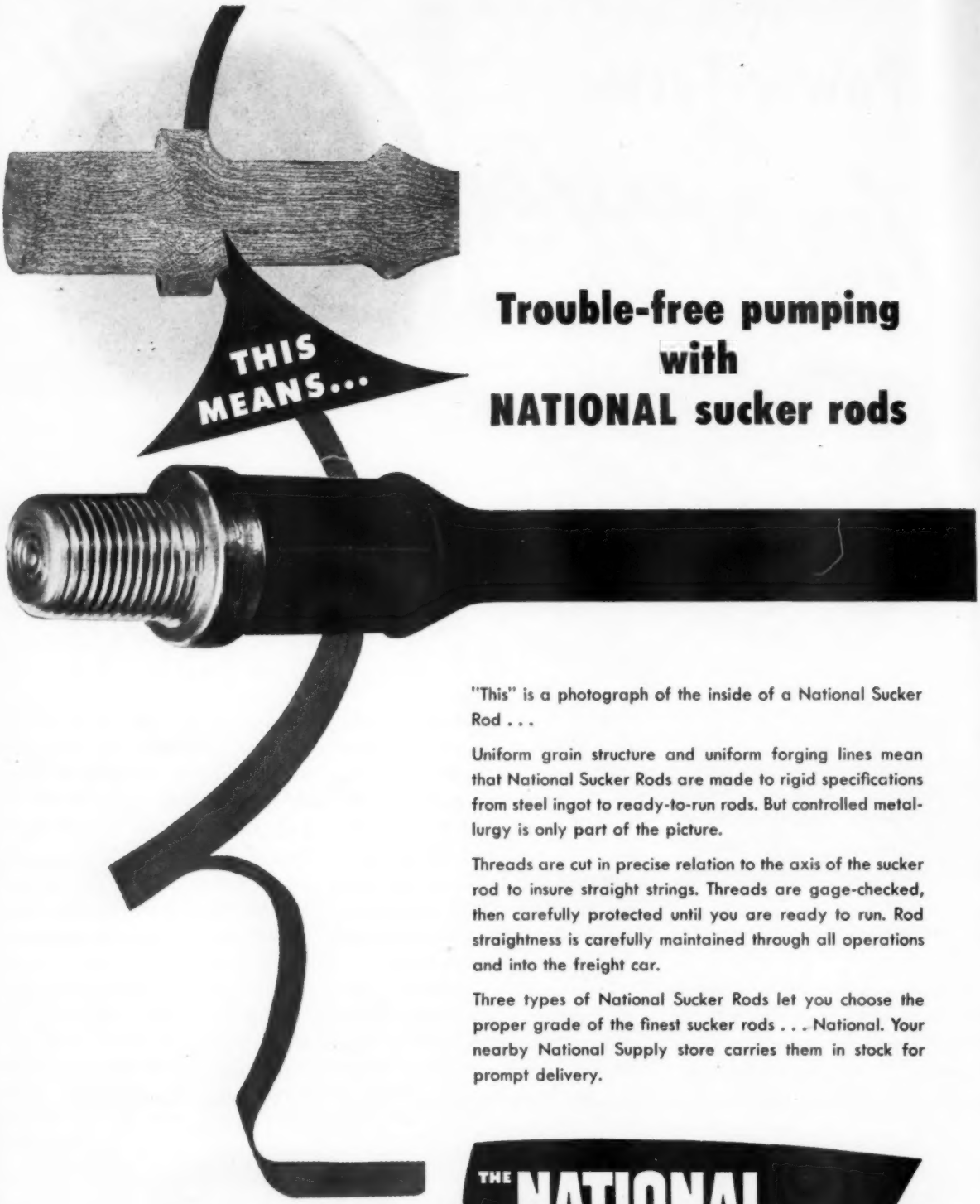
A HYDRO-SHEAVE takes only a few minutes to install. It improves the power-factor, cuts down stresses on the sucker rod string, often permits you to select a motor on running, instead of starting, requirements. Why not write for complete details today.

*Clutches & Hydraulic Drives*

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA




# Trouble-free pumping with NATIONAL sucker rods

"This" is a photograph of the inside of a National Sucker Rod . . .

Uniform grain structure and uniform forging lines mean that National Sucker Rods are made to rigid specifications from steel ingot to ready-to-run rods. But controlled metallurgy is only part of the picture.

Threads are cut in precise relation to the axis of the sucker rod to insure straight strings. Threads are gage-checked, then carefully protected until you are ready to run. Rod straightness is carefully maintained through all operations and into the freight car.

Three types of National Sucker Rods let you choose the proper grade of the finest sucker rods . . . National. Your nearby National Supply store carries them in stock for prompt delivery.

THE NATIONAL SUPPLY COMPANY

GENERAL SALES OFFICES: TOLEDO, OHIO

NATIONAL BLUE PRODUCTS

***DIVISION OFFICES:*** CASPER; FT. WORTH; PITTSBURGH; TULSA; TORRANCE.

***CANADA:*** THE NATIONAL SUPPLY COMPANY, LIMITED, ROOM 202, ALBERTA BLOCK, CALGARY, ALBERTA.

***EXPORT:*** NATIONAL SUPPLY EXPORT CORPORATION, 30 ROCKEFELLER PLAZA, NEW YORK, N.Y., U.S.A. RIVER PLATE HOUSE, 12 SOUTH PLACE, LONDON E. C. 2.

**NATIONAL OIL FIELD MACHINERY AND EQUIPMENT . . . SPANG PIPE . . . SUPERIOR & ATLAS ENGINES**

XUM

# It's Easy TO CHANGE TO DARCOVA

THE ORIGINAL COMPOSITION CUP

MOST engineers and operators in charge of reciprocating pumps are aware that Darcova Pumcups offer distinct advantages over piston packing of other types—that Pumcups last 5, 10, or even 100 times as long, that fluid slippage is all but eliminated, that efficiency doesn't decrease with Pumcup wear, that pump speed can be reduced and volume increased, that power is saved, and that downtime and maintenance expense are cut to a fraction.

But what many of these men are not aware of is the downright simplicity of changing over to Darcova Pumcups. It's easier than replacing with the old type packing.

To simplify the change-over, to prolong liner and pump life, Darling Pistons are recommended. They are carried in stock at all times, can be supplied in various metals and alloys for every industrial need.

For a free bulletin containing complete information, write, or use the coupon below.

Darling Valve & Mfg. Co., Williamsport 1, Pa.
Please send me the free bulletin checked below:
☐ No. 4401 Darcova Pumcups for reciprocating pumps.
☐ No. 4502 Darcova Pumcups for air or hydraulic mechanisms.

Name_____
Company_____
Address_____
City_____ State_____

DARCOVA
THE ORIGINAL COMPOSITION CUP

**DARLING VALVE & Manufacturing Co.**
WILLIAMSPORT, PA.



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## *I'd Like to Know . . .*

You may have heard that a suit has been filed by the Antitrust Division in Washington to break up Standard of California as well as six other West Coast oil companies. Hundreds of people have already written us protesting this action and many have asked pertinent questions. We believe these questions should be answered for everyone. And we take this way of doing so. If you have a question we urge you to write: •

"I'd Like to Know"
225 Bush Street, San Francisco 20

# "Who wants to upset the West's oil industry now?"

**John E. Clark, insurance man from San Francisco, California, writes,** *"From all I can gather, the West's oil companies have contributed a lot to our area. Now there's talk about breaking them up. What I'd like to know is who wants to upset the West's oil industry now?"*

**Do customers?** Not likely. Oil companies have turned out constantly better products and services at reasonable prices. Except for taxes, a gallon of gasoline today costs about what it did in 1919.

**Do employees?** The average income of 28,000 Standard people was $4,447 last year. And Standard Oilers are covered by sickness, free insurance, retirement and other employee benefits.

**Do small business men?** Standard of California is a big customer for small businesses in the West. Last year, for example, we spent more than $90,000,000 with some 10,000 business firms.

**Do stockholders?** Surely not. There has never been a year when Standard has failed to pay a dividend. 98,600 individuals share Standard's earnings, depend on Standard to keep their savings secure.

**Do tax collectors?** Standard turns in the taxes *you* pay when you buy gasoline and oil, and we are also taxed, of course, as a company. Because we *are* big, our taxes are sizeable — last year, over $95,000,000.

**Do military men?** Planes, ships, tanks are powered with oil. Military men naturally look to the *big* companies to supply their big needs. As in World War II, Standard's facilities are producing petroleum products at full speed.

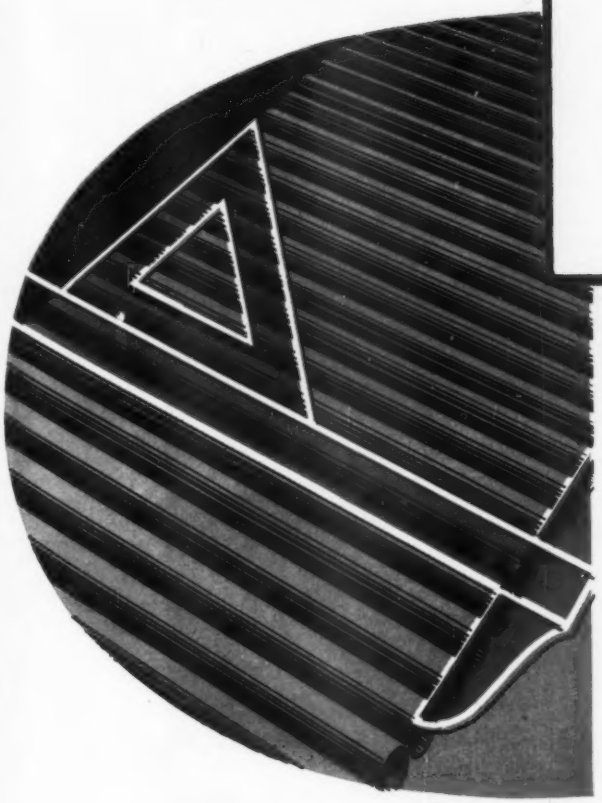
A certain minority in the U. S. seems to believe big companies should be broken up . . . even though big companies have led the way in helping provide an unmatched standard of living and helped keep the nation strong. The U. S. was very thankful for its big companies during the last two world wars . . . and is again in today's critical times. This is a big country with big problems, and it needs both big and small companies to meet them. You can be certain we will do everything we can to continue doing a good, efficient, productive job for you and the nation . . . a good *big* job.

**STANDARD OIL COMPANY OF CALIFORNIA**

**• plans ahead to serve you better**

XUM

# Why the *FIRST* names in pipelines depend on the *FIRST** name in line pipe



***FIRSTS by A. O. SMITH • Welded line pipe • Internal expanded pipe • Light wall large diameter pipe • World's largest producer of large diameter welded steel line pipe**

• Creative engineering is a 76-year-old tradition at A. O. Smith. One of A. O. Smith's outstanding "firsts" is the internal expanding process that assures the roundness, straightness and accuracy of dimensions of A. O. Smith Line Pipe.

Here's what this means: line pipe is stressed beyond its yield point by uniform internal expansion—a process that produces higher yield strength. The result is line pipe that is lighter and stronger . . . yet requires no expensive alloy steel to obtain these desirable characteristics. It all adds up to a better line pipe that is simple and economical to weld—permits higher operating pressures—lower cost per mile.

A. O. Smith Line Pipe is available in a complete range of sizes and wall thicknesses, from 8⅝ in. to 36 in. in diameter.

A.O. Smith 76th ANNIVERSARY 1874 1950

**DEPENDABILITY** *through* **RESEARCH** *and* **ENGINEERING**

**A.O.Smith**

**LINE PIPE • CASING**

**A. O. Smith Corp., Milwaukee 1 • Chicago 4 Dallas 2 • Denver 2 • Houston 2 • Los Angeles 12 • Midland 5, Texas • New York 17 • Phoenix • Pittsburgh 19 • Salt Lake City 1 • San Diego 1 • San Francisco 4 Seattle 1 • Tulsa 3 • Washington 6, D. C. International Division: P.O. Box 2023, Milwaukee 1**



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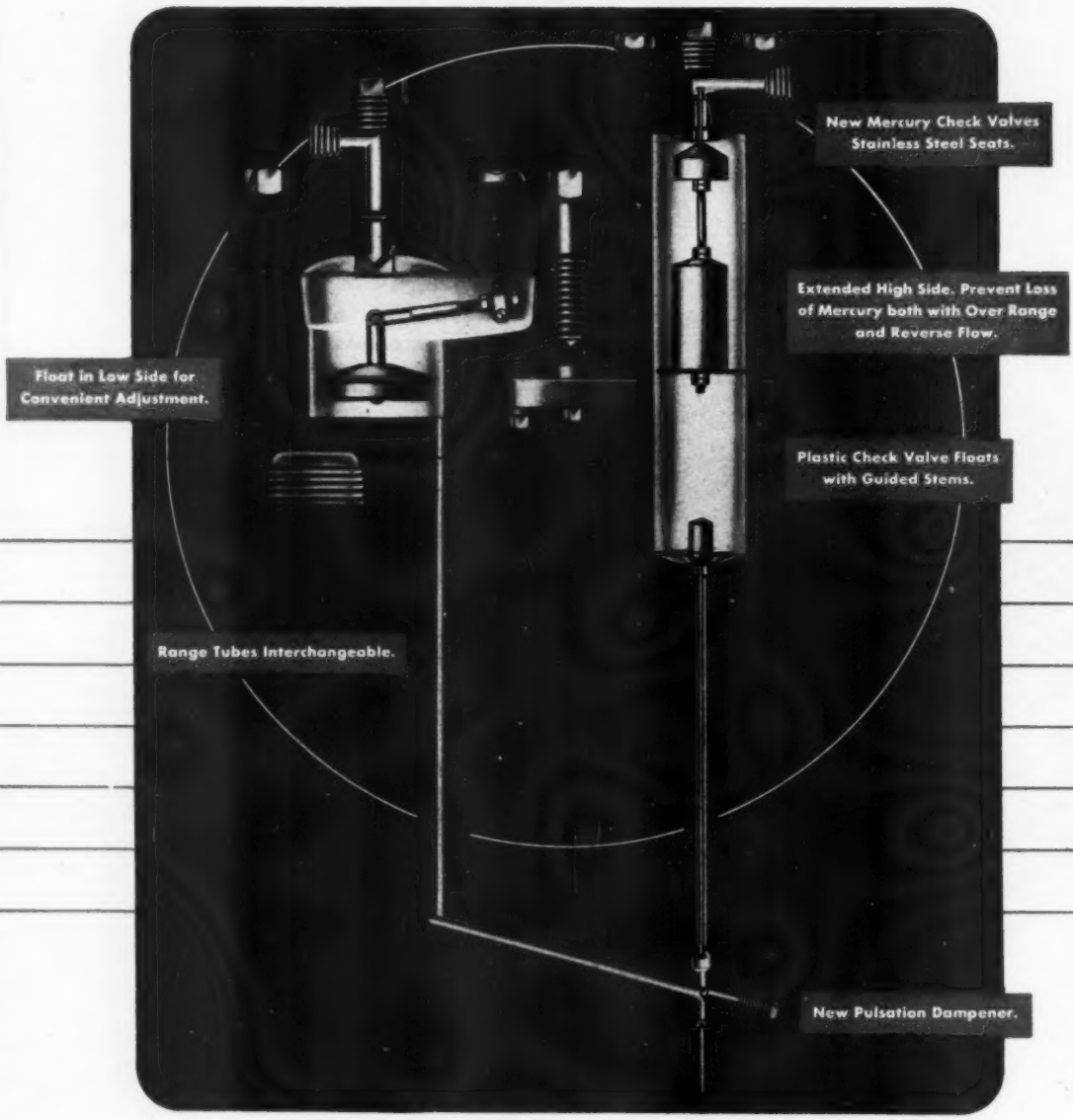
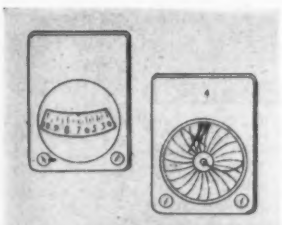
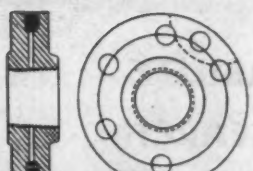
# accurate • sensitive


New Mercury Check Valves Stainless Steel Seats.
Extended High Side. Prevent Loss of Mercury both with Over Range and Reverse Flow.
Float in Low Side for Convenient Adjustment.
Plastic Check Valve Floats with Guided Stems.
Range Tubes Interchangeable.
New Pulsation Dampener.



**PNEUMATIC TRANSMITTERS AND CONTROLLERS**
(Bulletin CT-49)

**HIGH PRESSURE IRONCASE DISPLACEMENT METERS**
(Bulletin 50-A)



**FLANGES**
(Bulletin EG-2)

**ORIFICES**
(Bulletin EG-2)

XUM

# and built for 5000# w.p.

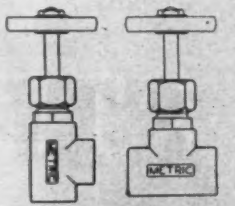
In response to insistent demands from gas and oil production men, the Model A-88 5000# American-Westcott Orifice Meter has been developed for high pressure services.

Designed in every way to operate safely and accurately under these pressures, the Model A-88 5000# Orifice Meter provides every feature that has made American-Westcott Orifice Meters outstanding for accuracy, simplicity and low maintenance cost. Its new design incorporates the proven features of the American-Westcott Orifice Meter and the many recent improvements in the A-88 Series to provide an accurate, rugged meter for today's higher operating pressures.

1. **Available in 50" and 100" ranges.**
2. **Low-side body constructed of forged steel of high tensile strength — high-side body made of extra heavy seamless steel.**
3. **Hydrostatically tested to 10,000 psi.**
4. **Adjustments easily made without disturbing working parts.**
5. **All parts can be handled and adjusted by small standard tools.**
6. **Every part accessible for cleaning without removing or loosening any connections that affect accuracy.**
7. **High sides interchangeable without affecting gage line connections.**

These and other American-Westcott features provide simple, accurate, dependable orifice meters that will handle the toughest kinds of measurement problems under the most rugged field conditions, with a minimum of servicing. They maintain to the highest degree the century old American Meter Company tradition of "sustained accuracy at lower cost." Write for descriptive matter.

PILOT LOADED, LARGE CAPACITY CBV REGULATOR (Bulletin 50)




NEEDLE VALVES, SCREWED AND UNION BONNET (Specification Sheet)

**AMERICAN METER COMPANY**

INCORPORATED (ESTABLISHED 1836)

GENERAL OFFICES • 60 EAST 42nd STREET, NEW YORK 17, N. Y.

60 East 42nd Street • New York 17, N. Y. • Albany
Alhambra • Atlanta • Baltimore • Birmingham
Boston • Chicago • Dallas • Denver • Erie
Fort Lauderdale • Houston • Kansas City • Los Angeles
Minneapolis • Odessa • Philadelphia • Pittsburgh
San Francisco • Tulsa.
In Canada—Canadian Meter Co., Ltd., Hamilton, Ontario.



XUM

# Want maximum tube life per dollar spent? Ask the experts!

OF all the high temperature tube steels made, only *one* can give you the best life/cost ratio. But how to select the *one right* steel from more than 20 analyses?

Get the help of the recognized authorities—the Timken Company metallurgists. Through 20 years of development and testing of 23 different analyses to solve specific problems of heat, pressure, corrosion and oxidation, they've gained the experience needed to choose the best steel for *your* job. And you're assured uniform, high quality steel in every tube because of complete, rigid controls—from melting to final tube inspection—practiced in our mills.

Let our "RSQ"—Research, Supply, Quality—solve your tube problems. Ask the experts! The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, O. Cable address: "TIMROSCO".

*This month we report on:*

## 2% CR.-MO.

*Has intermediate corrosion resistance in combination with good creep strength and fair resistance to oxidation. For use at temperatures up to 1200°F. in cracking coils, reforming units, heat exchangers, vapor line and hot oil piping, and return bend forgings for oil heaters.*

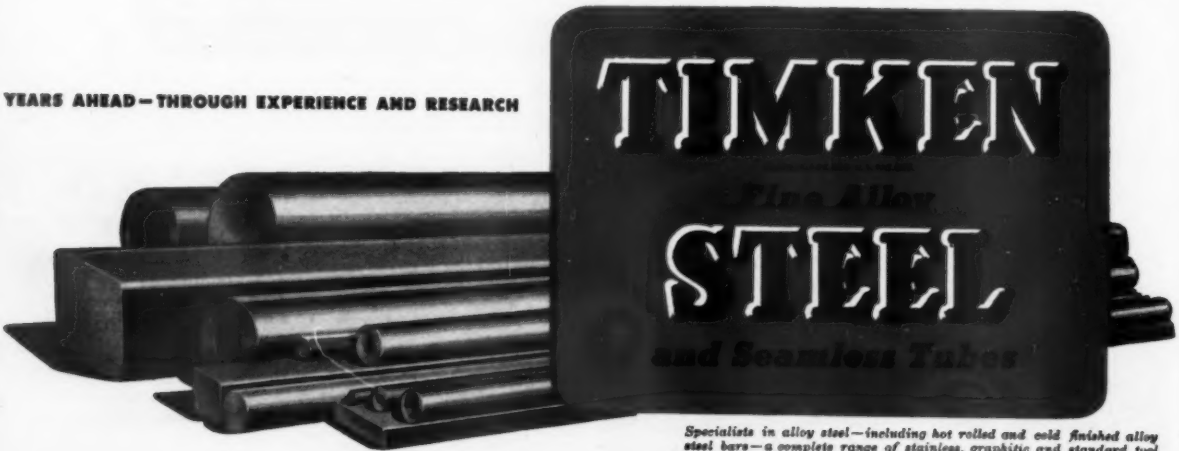
**23 TIMKEN STEELS FOR HIGH TEMPERATURE SERVICE**

| | | | |
|---|---|---|---|
| Carbon | Sicromo 2 | Sicromo 5S | 16-13-3* |
| Carbon-Mo. | Sicromo 2½ | Sicromo 5MS | 25-20* |
| DM-2 | 2¼% Cr.-1% Mo. | Sicromo 7 | 25-12* |
| Silmo | Sicromo 3 | Sicromo 9M | 35-15* |
| DM | 4-6% Cr.-Mo. | 18-8 Stainless | 16-25-6* |
| 2% Cr.-Mo. | 4-6% Cr.-Mo.-Ti. | 18-8 Cb | |

**Available as seamless tubing on an experimental basis only.*

*20 years of extensive testing and research have made the Timken Company the leading authority on high temperature tubing. Photo shows Charpy impact tests.*

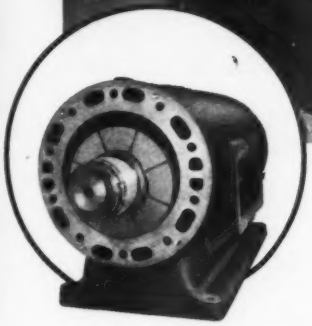
**YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH**




*Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.*

XUM

# EXCEPTIONAL BOOSTING CAPACITY



Four Natural Gas Boosters on a lease near Stinnet, Texas. Two Fuller single-stage compressors operating at 575 rpm. boost pressure from 5 to 50 psig. Each handles 3,000,000 SCFD. Two other units operating at 690 rpm. ups pressure from 50 to 135 psig. Each handles 2,500,000 SCFD. All are direct motor driven.

Size for size, Fuller Rotary Compressors offer *extra-ordinary boosting capacity*. Spot them along gathering lines—they'll maintain this capacity every day of their extra-long lives. They're compact, with a simple, direct drive that eliminates power transmission losses. Wherever gas is handled, they have earned their reputation for durability and dependability. Fuller Rotary Compressors give constant low-cost service in every kind of location, under every kind of condition. They boost pressure to trunk line or plant level efficiently, with little inspection and servicing. Moving parts have been kept at a minimum—rotor, blades and bearings. There are no valves to leak or to be ground. Blades automatically compensate for wear. Pulsation and vibration have been eliminated. Special attention to every engineering detail makes them tough enough to handle the most difficult boosting job.

If you're interested in the most efficient, economical way to boost pressure, call a Fuller Engineer. He will give you complete information.

Fuller Rotary Compressors are described in detail in Bulletin C-5.

**fuller**

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS
COMPRESSORS AND VACUUM PUMPS
FEEDERS AND ASSOCIATED EQUIPMENT

FULLER COMPANY, Catasauqua, Pa.
120 So. LaSalle St., Chicago 3
420 Chancery Bldg., San Francisco 4

C 209



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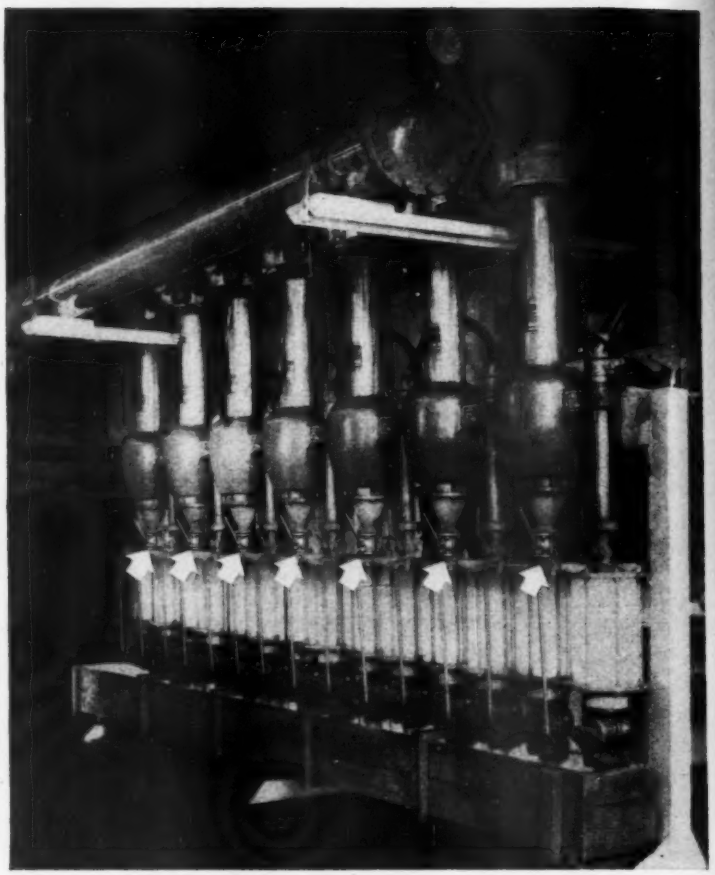
# HOW A Production Wise MANUFACTURER CUT EXPENSES with ROCKWOOD ball VALVES



The Bird Machine Company of South Walpole, Mass. now equips all Dirtec units (right) with Rockwood Ball Valves to assure papermakers better and longer *trouble-free* valve service. These efficient Dirtec units have won their place in the dirt removal phase of operation in paper mills of all kinds and sizes on the basis of practical demonstrated performance. Rockwood is helping to keep this enviable performance record by producing a ball valve that will operate over and over again without requiring maintenance.

The design engineers of the Bird Machine Company picked Rockwood Ball Valves for the Dirtec units because the valves have features that really help solve today's tough valve operating and maintenance headaches. Once Rockwood Valves are installed, valve troubles stop! Every Rockwood Valve is easy to install and operate — constantly dependable.

Rockwood Ball Valves are designed and engineered for the tough piping jobs. Equip your plant and machines now with Rockwood Valves — the valve that increases production by cutting maintenance cost.

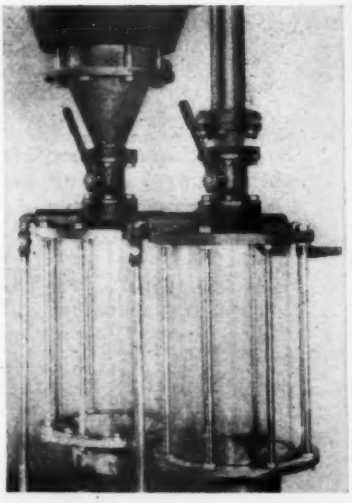
Thousands of Rockwood Ball Valves are giving efficient and economical service in oil refineries, food, paper, textile, chemical and rubber plants, etc. Rockwood Ball Valves are available in all pipe sizes from ½" to 4" and are recommended for 300 p.s.i. working pressure.

*Write today for illustrated booklet V-4. Distributors in all principal cities.*

**7 *Good Engineering* Features Why Rockwood Ball Valves Will Do The Job Better . . .**

**1.** Full *round* open area — no turbulence in fluid stream. **2.** Leak proof after continued use. **3.** New floating ball — resists pitting, scratching and abrasion. **4.** No exposed seating surface in open or closed position. **5.** Easy to open or close under full pressure. **6.** Installed in any position. **7.** Quarter turn (90°) opening and closing valve.

Picture below shows close-up of the latest design of Dirtec. Rockwood Valves isolate the body of the Dirtec from the sump in which the dirt collects. At bottom of sumps, a 2" Rockwood Valve is used for dumping the dirt.



**ROCKWOOD SPRINKLER CO**

104 HARLOW STREET WORCESTER 5, MASS

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# Drivers Prefer Trucks with EATON *2-Speed Truck* AXLES

Drivers report they are less fatigued after long trips on trucks with Eaton 2-Speed Axles. Eaton equipped trucks are easier to maneuver; quicker on the get-away in traffic; climb hills more smoothly; highball on the open road yet have plenty of power to pull out of tough spots.

These advantages are possible because Eaton 2-Speed Axles give drivers twice the conventional number of gear ratios from which to choose the one best suited for road and load conditions.

Truck owners also are pleased with Eaton 2-Speeds by the saving in maintenance costs, faster schedules, lower cost per mile. Your dealer will be glad to explain how Eaton's planetary gearing, positive lubrication and other exclusive features make Eaton axles last longer.

*Axle Division*

**EATON MANUFACTURING COMPANY**

CLEVELAND, OHIO

PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • JET ENGINE PARTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS SPRINGTITES • SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

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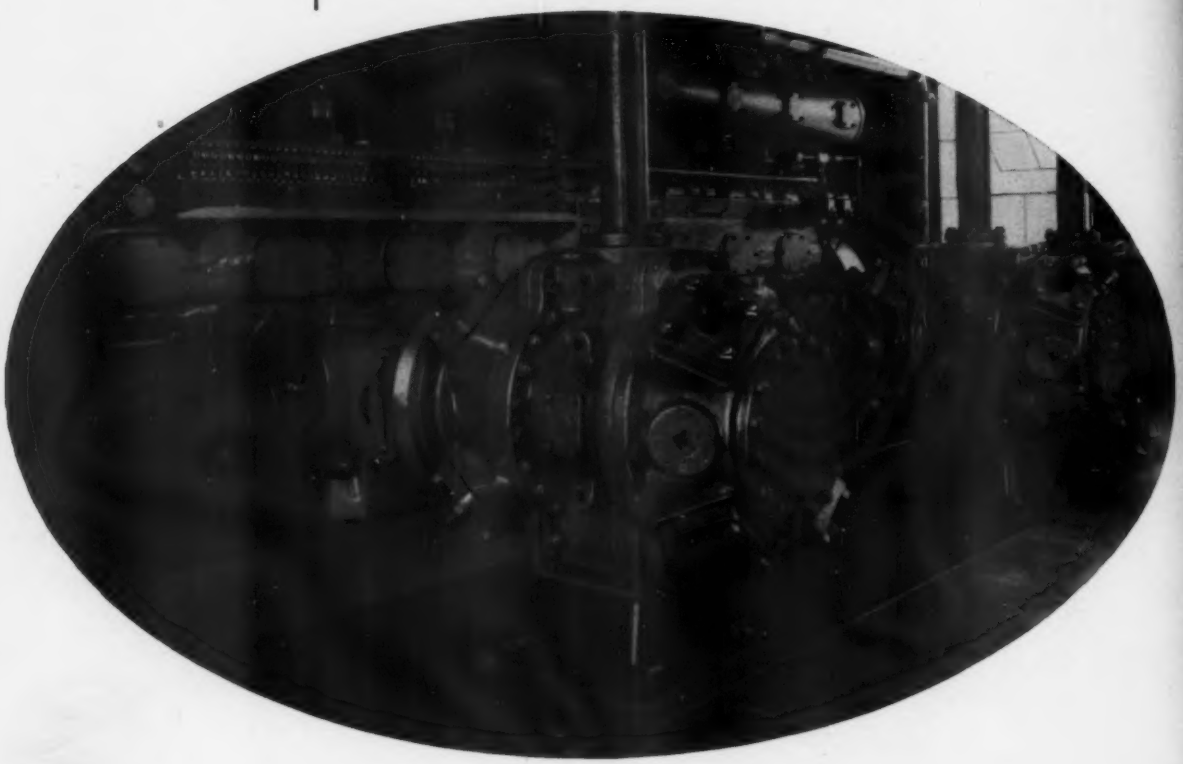
Insure dependable performance of pipe-line compressor units, reduce maintenance costs

with **Gulf Security Oil**



You make a two-way savings when your pipe-line compressor units are lubricated with Gulf Security Oil—lower maintenance costs, less out-of-service time.

Gulf Security Oil provides outstanding protection for bearings and cylinder walls in both engines and compressors. After years of operation with this quality lubricant, equipment shows remarkable freedom from cylinder wear and a minimum of carbon deposits on valves and rings.

Because of its excellent resistance to oxidation, Gulf Security Oil stands up for many hundreds of hours without appreciable change in its original properties. And because oil control rings are kept clean, oil consumption is remarkably low.

Many operators of units lubricated with Gulf Security Oil report that this quality oil insures more operating hours between overhauls and helps them avoid unscheduled shutdowns. And Gulf's delivery service is tailored to meet the needs of every pipe-line operator.

For complete information on Gulf Security Oil and for expert help on any lubrication problem, call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office. Gulf Oil Corporation · Gulf Refining Company, Gulf Building, Pittsburgh 30, Pa.

FIFTY YEARS OF SERVICE
1901 GULF 1951
PETROLEUM AND ITS PRODUCTS

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# Emblem Of Leadership

There's no substitute for experience—or for quality. Drillers with a life-time of experience select as their *first choice* Thermoid Powerflex Rotary Hose for safety, dependability, and economy.

Powerflex Rotary Hose is tested to 5000 psi before shipment—a test far more severe than the most grueling field operations . . . Tube is synthetic rubber, oil and abrasion resistant —reinforced with steel cables and prestretched fabric . . . Cover resists aging, abrasion, cracking . . . Couplings are built-in and anchored securely for life of hose.

Thermoid Powerflex Rotary Hose is an achievement in *advanced* hose engineering . . . it is a typical example of the high quality which has made all Thermoid Oil Field Products leaders in the oil fields.

*Midcontinent office and warehouse: Houston, Texas*

Powerflex Rotary Hose • Trioflex Slim-Hole Rotary Hose • Mud-Flo Slush Pump Hose • Flexible Discharge Units • F.H.P. and Multiple V-Belts • Oil Country Flat Belting

**Thermoid**

Wire Line Turn Backs • No-Wip Line Savers • Stuffing Box Rings • All Types of Hose • Molded Specialties • Brake Blocks

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



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# New 1951 CHEVROLET TRUCKS

## Better before...now better than ever

America's best truck investment is an even better one for '51! Yes, this latest line of Advance-Design trucks combines the greatest of Chevrolet's traditional advantages with new features and improvements that make your dollars go farther than ever! Along with outstanding power and economy, finest construction and superior handling ease, Chevrolet Advance-Design trucks offer new, improved-design brakes, new Ventipanes, and Chevrolet's new cab seats—plus a host of other features that mean increased value to owners. See your Chevrolet dealer and look over this new line of 1951 Chevrolet trucks today. They're "best buys" every one!

CHEVROLET MOTOR DIVISION *General Motors Corporation* DETROIT 2, MICHIGAN

CHEVROLET

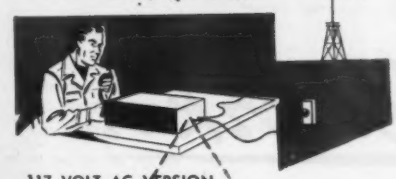
### ADVANCE-DESIGN TRUCK FEATURES

**TWO GREAT VALVE-IN-HEAD ENGINES—the 105-h.p. Loadmaster or the 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSIONS—for fast, smooth shifting • HYPOID REAR AXLES—for dependability and long life • NEW TORQUE-ACTION BRAKES—for light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—for medium-duty models • NEW TWIN-ACTION REAR BRAKES—for heavy-duty models • NEW DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • NEW CAB SEATS—for complete riding comfort • NEW VENTIPANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGN BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.**

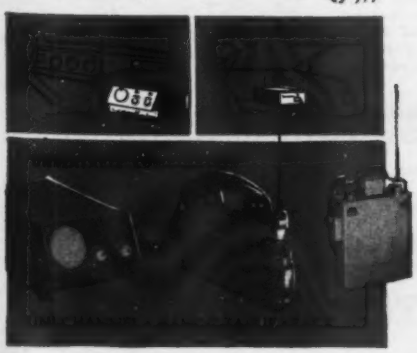
MOTOROLA PUTS ITS MARVELOUS SENSICON CIRCUIT INTO THIS

# New "Line" Tool

6 OR 12 VOLT DC VERSION AS EMERGENCY BASE STATION



117 VOLT AC VERSION AS A BASE STATION



**YOU CAN TAKE IT ALONG—ANYWHERE!**

- **INSTALLS QUICKLY IN ANY TYPE VEHICLE**
- **USE IT AS A BASE STATION**
- **WORK IT IN WITH YOUR "HANDIE-TALKIE"* UNITS for LIAISON WITH CREWS**

Eliminate outage, mileage, maintenance and replacement costs at the outset. Select Uni-Channel. It's built to take it—the kind of a tool that *belongs* with your other gear....

Remember long after other communications have broken or failed, Uni-Channel will continue to give you trouble-free communication—and for good reason....

The unique Sensicon circuit heads the list of EIGHT revolutionary Motorola improvements, putting working facts back of your decision—with low over-all cost the final payoff for your choice.

REMEMBER! Motorola's long experience in practical mobile radio makes Uni-Channel your best choice for day-in and day-out dependability!

**Only Motorola makes the "Handie-Talkie" radiophone!*

**FM 2-WAY RADIO**

# Motorola

***Radio Communication Systems for Industry***

**SPECIALISTS IN MOBILE RADIO FOR 20 YEARS**

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# WE DO THE *spadework..*

THE thorough-going procedures of the field crews, the competency of the party chiefs, and the extensive professional experience of *every* key member of the Independent organization is the foundation on which a long list of oil producers have been building successful geophysical exploration programs for 18 years. The success of your own quest for new oil reserves depends on how well the spadework is done. It will pay you to consult with Independent about your next survey project.

*N. N. Zirbel graduated from Rice Institute and started to work with Independent 18 years ago. He went through the mill learning thoroughly the function of every man on a survey party before becoming a party chief. Only men with such extensive training and field background hold posts of responsibility with Independent.*

POINTING THE WAY FOR THE DRILL

IXC

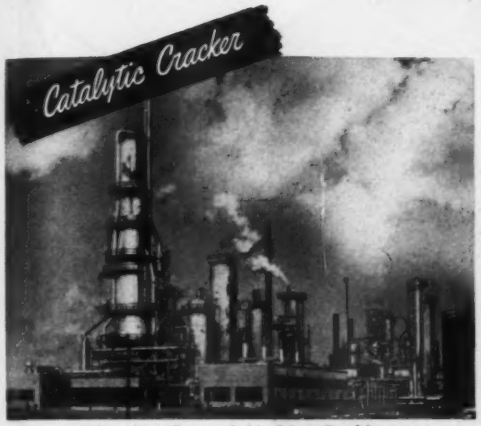
**Independent** *Geophysical Surveys*

**EXPLORATION COMPANY**

1973 WEST GRAY ★ HOUSTON, TEXAS

ESTABLISHED 1932

# How you can solve your Compressor Surge Problems




Burgess-Manning Gas and Air Line Snubbers on gas engine compressors of this Texas refinery.

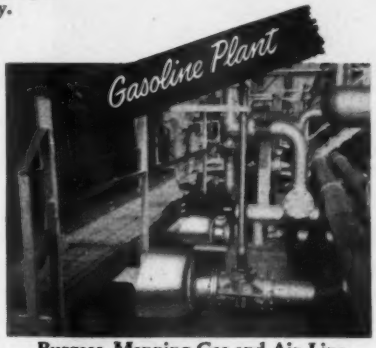
## BURGESS-MANNING ENGINEERS

### Specialists in Surge Control in Gas and Air Line Systems

Burgess-Manning engineers are eminently qualified by over twenty years' extensive training and experience to solve your existing pipe line surge problems. We will work intimately with your own engineering staff in the design of proposed compressor installations that will be free from surging and the resultant vibration of gas and air lines excited by compressors, blowers, or reciprocating pumps. Through proper design, such costly innovations as special piping or specially reinforced pipe line structures will be unnecessary. Metering fluid flow will be greatly improved in a properly designed system.

Our consultation and design services in the field of compressible fluid surge control will help you to reduce plant shutdowns due to equipment failure, reduce costly maintenance, and aid you in maintaining the operation of your plant at rated capacity. We invite your inquiries.

Burgess-Manning Snubbers installed on compressors at this large Oklahoma Compressor Station.

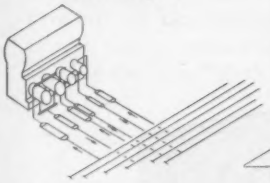



Burgess-Manning Gas and Air Line Snubbers installed on compressors at a natural gasoline plant.

Burgess-Manning Gas and Air Line Snubbers installed ahead of meter runs at a Wyoming recycling plant.

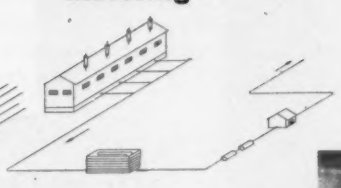
## THE BASIC PROBLEMS

### Vibration



Burgess-Manning Gas and Air Line Snubbers eliminate, reduce, or prevent vibration in all lines due to the intermittent suction or discharge of compressors, blowers, or pumps. They also protect associated equipment from mechanical failures due to excessive gas surge.

### Metering



Burgess-Manning Gas and Air Line Snubbers smooth the flow of gas without constriction and stop vibration without mechanical damping. Metering fluid flow is greatly simplified in a properly designed system. Regulating instruments operate properly.

WRITE FOR FREE BOOKLET

### APPLICATIONS

• Oil and Gas Production • Oil and Gas Well Repressuring and Recycling • Gas Transmission • Gas Distribution • Natural Gasoline Industry • Manufactured Gas Industry • Petroleum Refining • Petrochemical Process Industry • Chemical Industry.

### RANGE OF OPERATIONS

• All pressures—up to 5,000 psi. • All gases and mixtures of gases, such as, hydrogen, butadiene, ammonia, propane, and freon. • All weights of gases—molecular weight as low as 6 to as high as 120. • All pipe sizes—as large as 24" diameter pipes.

## BURGESS-MANNING COMPANY

LIBERTYVILLE, ILLINOIS

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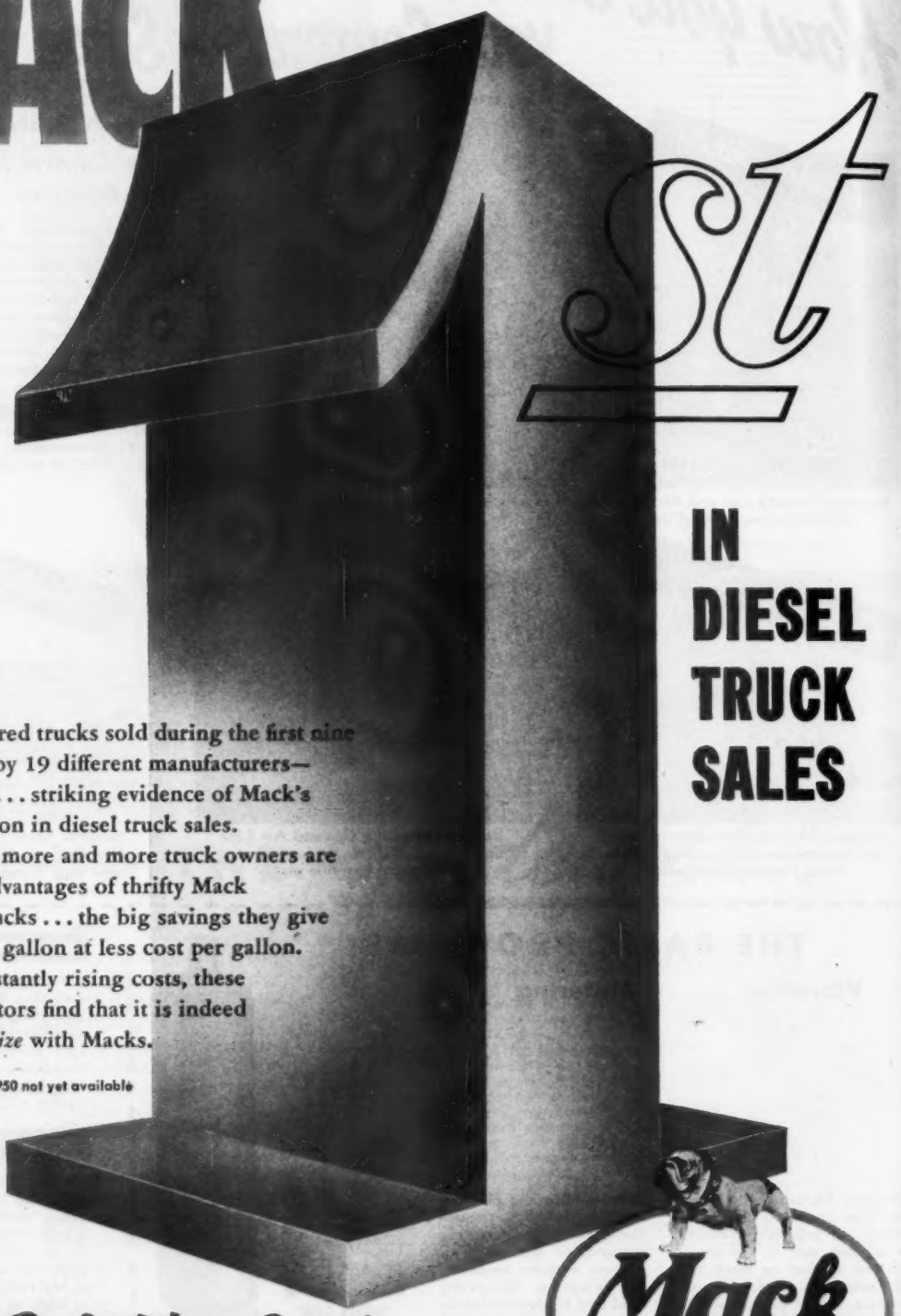
# MACK



# 1st IN DIESEL TRUCK SALES

Of all diesel-powered trucks sold during the first nine months of 1950* by 19 different manufacturers—41% were Macks . . . striking evidence of Mack's top-ranking position in diesel truck sales.

The country over, more and more truck owners are discovering the advantages of thrifty Mack diesel-powered trucks . . . the big savings they give in more miles per gallon at less cost per gallon.

In the face of constantly rising costs, these progressive operators find that it is indeed *profit-wise to dieselize* with Macks.

*Final figures for 1950 not yet available

## Be Profit-Wise...Dieselize with Mack TRUCKS

*outlast them all*

Mack Trucks, Empire State Building, New York 1, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.



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The S. S. Jahra on her delivery trials.

# Supertankers for Superservice

The *S. S. Jahra,* first of more than a score of 28,000-ton supertankers constructed by Bethlehem shipbuilding yards for private interests in the past two years, is an outstanding example of Bethlehem's ability to design and construct ships to meet the specific requirements of the individual operator or of an entire industry.

These vessels represent fulfillment of the petroleum industry's need for big, fast, highly-efficient carriers capable of transporting oil products to and from the far-flung corners of the globe on a low-cost basis.

Fully representative of American postwar shipbuilding skill and achievement, these supertankers can be expected to provide many years of high-standard and low-cost service for their operators, because they have all of the inherent characteristics which for almost half a century have distinguished every ship bearing the title, "Bethlehem-Built."

MAIN PARTICULARS OF THE S. S. JAHRA

| | |
|---|---|
| Length, overall | 624 ft. 9¾ in. |
| Length, between perpendiculars | 595 ft. 0 in. |
| Breadth, molded | 84 ft. 0 in. |
| Depth, molded | 44 ft. 0 in. |
| Draft, molded | 33 ft. 0 in. |
| Deadweight, tons | 28,300 |
| Cargo capacity, bbls. | 240,400 |
| Shaft horsepower, max. | 13,750 |
| Speed, fully loaded, about | 16½ knots |

**SHIP REPAIR YARDS**

| | |
|---|---|
| Boston Harbor | New York Harbor |
| Baltimore Harbor | Beaumont, Texas |
| Los Angeles Harbor | San Francisco Harbor |

**SHIPBUILDING YARDS**

| | |
|---|---|
| Quincy, Mass. | Staten Island, N. Y. |
| Sparrows Point, Md. | Beaumont, Texas |
| Terminal Island, Calif. | San Francisco, Calif. |

*SHIPBUILDERS* *SHIP REPAIRERS*

**BETHLEHEM STEEL COMPANY**

*Shipbuilding Division*

General Offices: 25 Broadway, New York 4, N. Y.

On the Pacific Coast shipbuilding and ship repairing are performed by the Shipbuilding Division of Bethlehem Pacific Coast Steel Corporation



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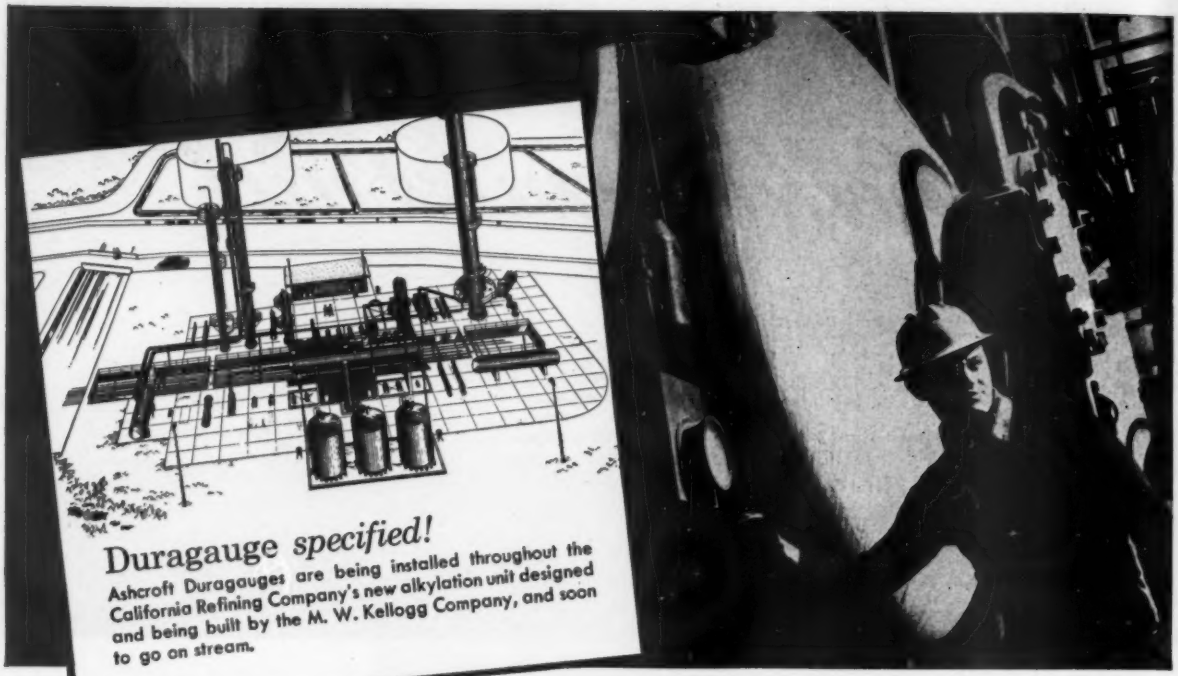


**Duragauge *specified!***

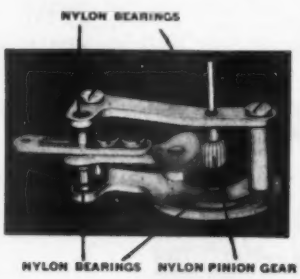
Ashcroft Duragauges are being installed throughout the California Refining Company's new alkylation unit designed and being built by the M. W. Kellogg Company, and soon to go on stream.

# THE STANDARD OF THE INDUSTRY

## *is the Ashcroft* DURAGAUGE

### WITH NYLON MOVEMENT*

*The Ashcroft Duragauge with Nylon Movement*




**Pat. Applied for*

Why? You need look no further than the unmatched record of Duragauge performance under the most "killing" service conditions to be found . . . facts that have brought about the unqualified specification of Duragauges for the most demanding new installations in both the petroleum and chemical fields.

It is, as engineers will verify wherever Duragauges are installed, the product of the most realistic approach to modern gauge design ever made for the accurate indication of pressure.

THE NYLON MOVEMENT . . . bearings and pinion gear shown in the illustration, is exclusive with the Duragauge and provides unprecedented impact absorption, retention of form and shape under high temperatures, low friction and corrosion resistance.

THE EXTRA WIDTH BOURDON TUBES, perfected by Ashcroft engineering in a complete range of materials to meet any service conditions, give greater sensitivity to slight pressure change. (All Bourdon Tube assemblies are whip-tested before shipping at pulsating pressures 50% higher than the tube rating!)

UNUSUALLY LONG TIP TRAVEL provides greater accuracy of indication.

MOUNTING DESIGN OF ROTARY MOVEMENT enables recalibration of gauges in the field with maximum accuracy in minimum time.

STURDY, FULLY-PROTECTIVE, LIFETIME CASES in a choice of materials and available for stem mounting, wall mounting, or flush mounting.

Inherent with these and many other features of Duragauge design is the high "quality throughout" standard that has identified all products of Ashcroft pioneering development and manufacture for more than 100 years.

Your distributor is prepared to give you every assistance in the proper application of the Ashcroft Duragauge with nylon movement for new and rehabilitated installations. He invites your inquiries.

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

# ASHCROFT *Gauges*

1850 ASHCROFT U.S.A.

*A Product of*

MANNING, MAXWELL & MOORE, INC.

STRATFORD, CONNECTICUT

Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' Industrial and 'Microsen' Electrical Instruments. Builders of 'Shaw-Box' Cranes, 'Budget' and 'Load Lifter' Hoists and other lifting specialties.

# Convenient!

## you can buy these products through these Companies

**DRESSER LONG SLEEVES**

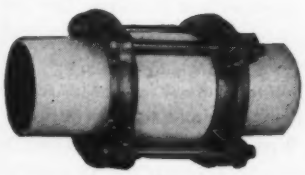
(Style 40) simplify pipe joining. Span gaps between pipe ends. No threading, exact fitting or aligning. Ideal joint at wells, separators, pumps, engines and tanks.

**DRESSER COUPLINGS**

(Style 38) speed laying of field, gathering and transmission lines; save time on hookups; absorb vibration at pumps, engines and compressors. 100% salvageable in relocating temporary lines.

**DRESSER SPLIT REPAIR CLAMPS**

(Style 79B) for quick repair of pitholes and longitudinal splits in pipe. Furnished with either one or two shells—an inexpensive "bandage" which saves cutting out short sections of damaged pipe.



**DRESSER COLLAR CLAMPS**

(Style 4,41) stop leaks through threads of screw collars, without service interruption. Band Clamps (Style 77B), Porous Weld Clamps (Style 55), and other pipe repair devices also available.

(Partial List)

Alamo Iron Works
American Pipe & Supply Co.
American Supply Co.
Arrow Supply Co., Inc.
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Bethlehem Supply Co.
F. W. Black
Bluefield Supply Co.
Bovaird & Co.
Bovaird & Seyfang Mfg. Co.
The Bovaird Supply Co.
Bradford Supply Co.
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The Cameron & Barkley Co.
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Cen-Tex Supply Co.
Clowe & Cowan, Inc.
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Franklin Supply Co.
French Tool & Supply Co.
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General Oil Field Supply Co., Inc.
Greenhead Bit & Supply Co.
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Houston Oil Field Material Co., Inc.
Howard Supply Co.
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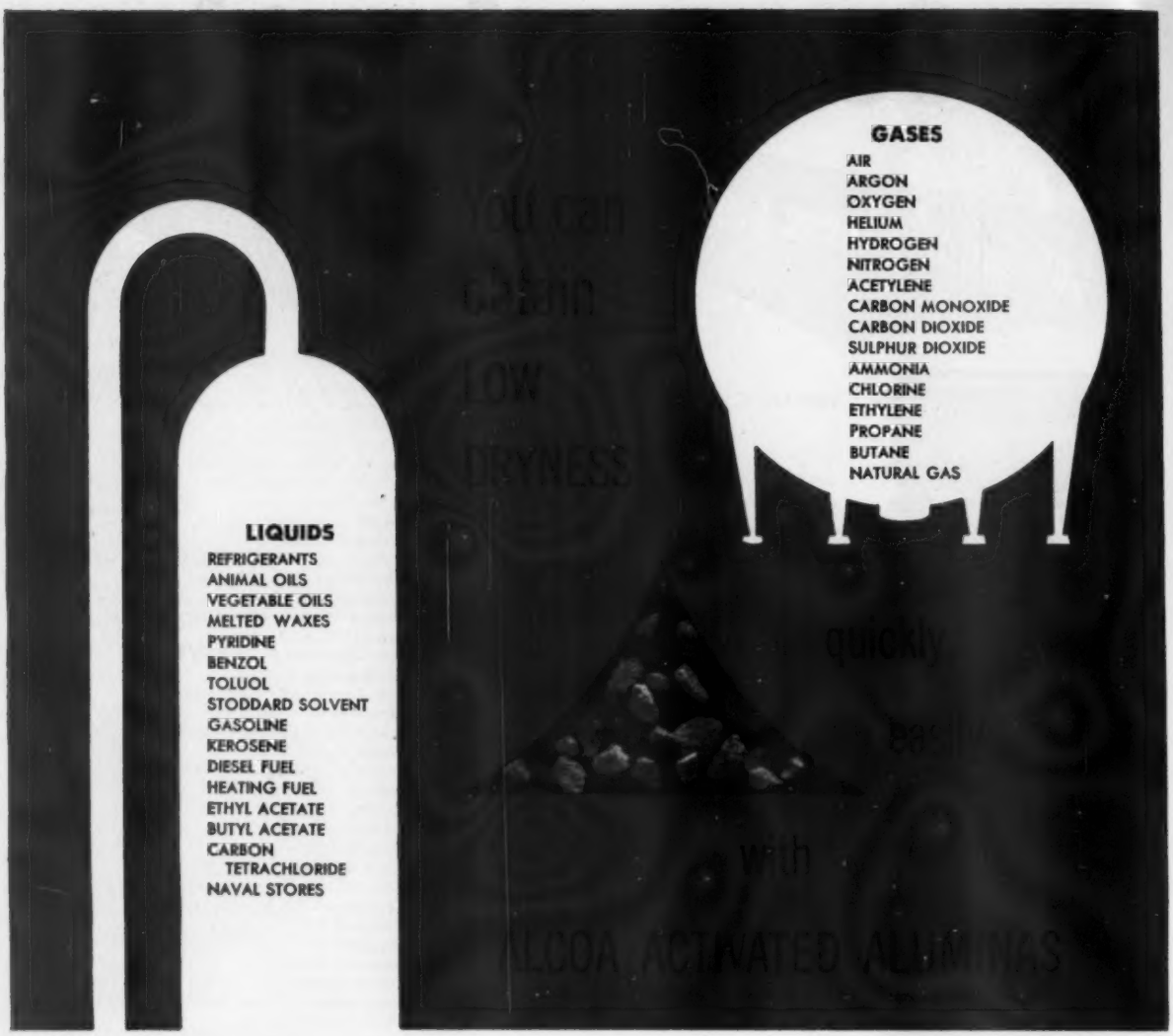
The McJunkin Supply Co., Inc.
Mid-Continent Supply Co.
Midland Supply Co., Inc.
Morrison Supply Co.
Mountain Iron & Supply Co.
Murray-Brooks Hardware Co., Ltd.
Murray Tool & Supply Co.
The National Supply Co.
Norvell-Wilder Supply Co.
Oil Well Supply Co.
Parkersburg Rig & Reel Co.
The Peerless Supply Co., Inc.
Pelican Well Tool & Supply Co.
Producers Supply & Tool Co.
Republic Supply Co.
Republic Supply Co. of California
Rodman Supply Co.
Standard Supply & Hardware Co., Inc.
Superior Iron Works & Supply Co., Inc.
United Supply & Mfg. Co.
Weaks Supply Co., Ltd.
Well Machinery & Supply Co., Inc.
Western Supply Co.
Wilson Supply Co.
Zanesville Tool & Supply Co.

## *Always within "hollering distance"*

at your nearest oil field supply store or our Houston Warehouse, Dresser products save installation time and give you *reliable* connections and repairs.

# DRESSER COUPLINGS and Repair Products

Dresser Manufacturing Division (One of the Dresser Industries), 59 Fisher Ave., Bradford, Pa. • Houston Office & Warehouse: 1121 Rothwell Street, Houston, Texas. • Sales Offices: New York, Chicago, Houston, San Francisco.




ALCOA Activated Aluminas are among the most effective and efficient desiccants available for the dehydration of liquids and gases. Dew points as low as *minus* 100° F. —and even lower—may be obtained, and under normal circumstances, ALCOA Activated Aluminas can be used for an almost indefinite number of drying cycles.

ALCOA Activated Aluminas have high resistance to crushing, shock and abrasion . . . do not soften, swell or disintegrate when immersed in water . . . are non-toxic . . . non-corrosive . . . high in purity . . . practically iron free.

Besides their use for dehydration, ALCOA Activated Aluminas adsorb certain gases and vapors from gaseous mixtures and serve as catalysts and catalyst carriers. They are used in the liquefaction of gases, and for the maintenance of transformer and lubricating oils.

We should like to tell you more about these efficient, solid-type desiccants. Write to ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 618B Gulf Bldg., Pittsburgh 19, Pa.

*Alcoa Chemicals*

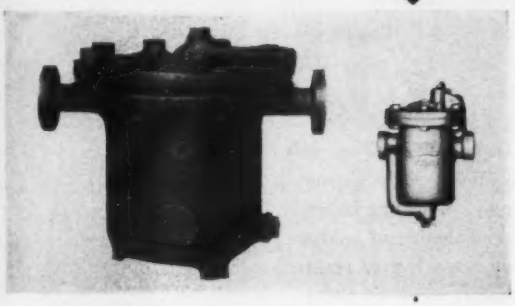
ALCOA ALUMINUM ®

**ALUMINAS and FLUORIDES**

ACTIVATED ALUMINAS • CALCINED ALUMINAS • HYDRATED ALUMINAS • TABULAR ALUMINAS • LOW SODA ALUMINAS ALUMINUM FLUORIDE • SODIUM FLUORIDE • SODIUM ACID FLUORIDE • FLUOBORIC ACID • CRYOLITE • GALLIUM

# FOR BIG TRAP CAPACITY IN A SMALL PACKAGE ...buy Armstrongs

SIZE FOR SIZE
THEY GIVE YOU MORE



ARMSTRONG steam trap capacity is a bargain size for size because of the patented leverage system. In an Armstrong trap for 100 psig, leverage is higher than in one for, say, 15 psig. Thus, a larger valve can be opened than would be possible if the leverage was the same for all pressures.

That sounds simple, but isn't. If higher leverage is secured with a longer lever arm, a bigger trap body is needed. That's the trouble with the elephant shown at the left. Also the design must permit the valve to open *wide* or it will restrict the orifice, reducing capacity. *Armstrong's design answers these problems better than any other design.*

P. S. When comparing traps be sure capacities are based (as are Armstrongs) on *actual* tests with condensate at steam temperature. No other basis is reliable. ARMSTRONG MACHINE WORKS, 868 Maple St., Three Rivers, Michigan.

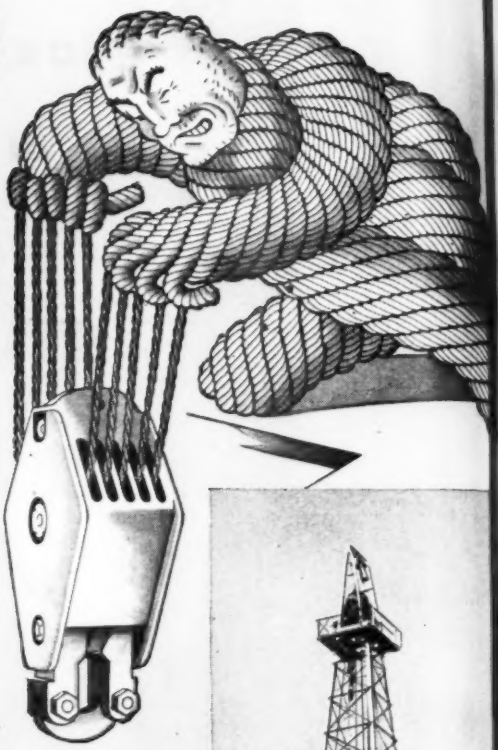
***FROM THE RIDICULOUS TO THE SUBLIME . . .*** **The monstrosity on the left is a steam trap once manufactured in Germany. It weighs 116 lbs. but has no more capacity than the 10½ lb. Armstrong trap on the right. All of which is a means of focussing your attention on the importance of a steam trap leverage system. The size of the big trap is necessary due to its crude-by-comparison leverage design.**

SEE OUR CATALOG IN SWEET'S

**The 36-PAGE STEAM TRAP BOOK gives dimensions, weights and actual capacities of Armstrong traps. Write for a copy or Call your local Armstrong Representative.**

# ARMSTRONG STEAM TRAPS

# Tuffy®
# ROTARY LINES
## for Standard or Jackknife Rigs



Both stalwarts of the oilfields with proven records of ton-mile economy. Both are Union-formed lines, made of special steels and unique in their construction. They have higher resistance to abrasion, shock loads, drum crushing and internal friction.

Tuffy ***Standard*** Rotary Line is designed for use with standard rigs. It gives you better performance and more round trips. It spools easily and is easy to cut when cutting is necessary.

Tuffy ***Jackknife*** Rotary Line is specially designed for use on jackknife rigs. It spools and reeves better on the smaller sheaves and drums of the jackknife rigs. For deeper drilling with jackknife rigs, we recommend Tuffy ***Standard*** Rotary Line.

***EASY TO ORDER.*** There are no complicated specifications to remember when you order Tuffy Rotary Lines. Merely specify the *length, size* and Tuffy ***Jackknife*** or ***Standard.***

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## Measure The Work Your Line Has Done and Avoid Wasting or Overloading

## Figure Ton-Mileage With This Free Union Wire Ton-Mile Indicator

Now, many drillers are coming up with the better wire rope performance and lower wire rope costs which rig owners have been demanding. By using the Union Wire Ton-Mile Indicator, they are establishing the correct time for cutting off on each hole. This enables them to avoid cutting the line too soon or too frequently which wastes rope. And, it enables them to prevent overloading and the resulting line breaks and costly fishing jobs. And, they have found out which rotary line delivers the most ton-miles.

The Union Wire Ton-Mile Indicator is easy to use. Merely set the figures from your well log book on the indicator. It does all the complicated figuring for you. You read the answer. Easy as that!

# Get Your Union Wire Ton-Mile Indicator Now

*Mail the coupon on this page. A Union field representative will deliver your free Ton-Mile Indicator to you and show how easy it is to use. He will also give you a handy Union Log Book to help you keep well records.*

union Wire Rope

MAIL THIS COUPON

**UNION WIRE ROPE CORPORATION**
*Specialists in Wire Rope*
2102 Manchester Ave. Kansas City 3, Mo.

Gentlemen: Please have your field man deliver my Union Wire Ton-Mile Indicator and explain its use.

Name.....

Address.....

City.....Zone.....State.....

# For all your Meters, Controls, Recorders

# ROCKWELL CHART DRIVES

## NEW DEPENDABILITY, ECONOMY, CONVENIENCE IN MECHANICAL TIMING

### STANDARD TYPE
### For Replacement Service

***Furnished with Adaptors to Fit Practically Any Instrument Case. Turrets Give Up To 11 Rotation Speeds***

You can save money on inventory by standardizing on Rockwell chart drives for all your instruments. You need stock only two basic Rockwell models plus a representative selection of inexpensive adaptors and turret speed changers. The adaptors will correctly position the drive in any instrument while the turrets will provide up to 11 different rotation speeds on the same drive.

### *STANDARD DRIVE FEATURES*

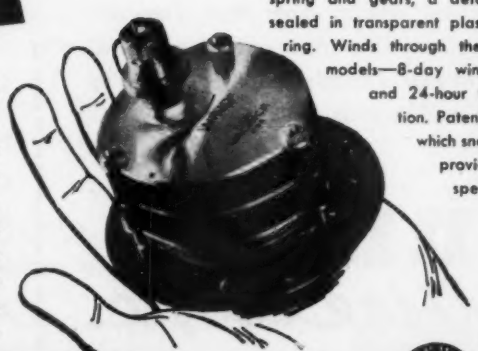
Dust proof, moisture proof case. Heavier mainspring and winding stem minimize principal causes of failure. Fitted with oil-sealed bearings, a single winding stem. Two basic models—8-day wind and 31-day wind. Turrets provide selection up to 11 speeds on one drive.

### MIDGET DRIVE
### obtainable on specification in most instruments

You can specify Rockwell Midget drives in instruments made by any manufacturer. The small size of the Midget allows more room for the other controls within the case and makes all the component parts readily accessible for service. Midget drives snap into a mounting ring which may be positioned on bosses or on adaptors to fit into any instrument case. In no other drive will be found the Rockwell combination of size, versatility, and high quality.

### *MIDGET DRIVE FEATURES*

Made in three parts: the case, including mainspring and gears, a detachable escapement sealed in transparent plastic and a mounting ring. Winds through the chart arbor. Two models—8-day wind, 24-hour rotation and 24-hour wind, 24-hour rotation. Patented turret converters which snap on the main arbor provide a selection of 11 speeds on 8-day model.

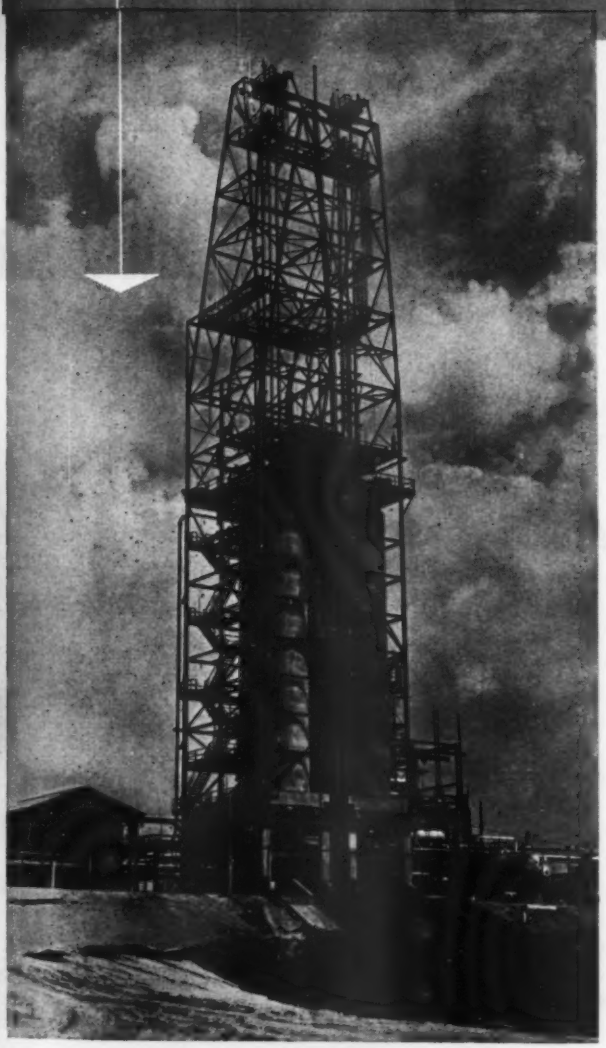


Attractive factory repair program — WRITE FOR BULLETIN NO. 1079

ROCKWELL MANUFACTURING COMPANY

*Pan-Am Southern relied on this sign...*

# *and got a Coking Unit ahead of schedule*



The new Coking Unit at Pan-Am Southern Corporation's El Dorado, Arkansas, refinery is another example of how the close coordination and control of all details on the part of Lummus paid off for the customer.

In spite of the fact a 42-day steel strike tied the "critical" tag to equipment fabrication schedules on this project, the unit was completed ***ahead*** of specified date. Holding down initial outlay and hastening on-stream earnings are frequent and welcome by-products of a Lummus contract. In this case, the unit underran guaranteed maximum cost by 8%.

Moreover, this unit went on stream immediately and operated 86 days out of the first 98 days after completion—a smooth-running result of good engineering and skillful construction. Today, the plant is playing an important role by increasing the flexibility of Pan-Am Southern's operation, and by helping to meet increased demand for gasolines and other light distillate products.

Pan-Am Southern management acknowledges ***extra*** value received for relying on the Lummus sign. It's a good symbol to look for, believe in and rely on when you buy complete, integrated engineering service for *your* next project.

Pan-Am Southern's coking plant charges crude fractionation bottoms previously sold as lower-grade fuel oils. Charge rate is 9,300 B/D of 13.0° API reduced crude. Product yields are 1,950 B/D of $C_4$-400 E. P. gasoline, 5,240 B/D of 25.0° API gas oil for cat cracker charge stock, 420 T/D of premium coke, plus a quantity of $C_3$ and lighter fuel gas.

**THE LUMMUS COMPANY**

385 MADISON AVENUE, NEW YORK 17, N.Y.

CHICAGO • HOUSTON • LONDON • CARACAS • PARIS

DESIGNING ENGINEERS AND CONSTRUCTORS FOR THE PETROLEUM AND CHEMICAL INDUSTRIES

# *Only* IN W-K-M VALVES

## THIS NEW PRESSURE SEAL BONNET

The pressure seal bonnet on W-K-M Valves is self-adjusting to pressure and temperature changes. Greater pressure on the bonnet gives a tighter seal instead of tending to push the bonnet off. There is considerably less area exposed to internal pressure in the new W-K-M Flow Line and Christmas Tree Valve.

The pressure seal bonnet requires no flanges, no studs and nuts. Double roller thrust bearings on the stem assure easy operation.

This is another of the several reasons why you may be sure that a W-K-M Valve will always effect a complete shut-off and will always open or close under full rated pressure.

## PLUS THESE OTHER PROVED FEATURES

- Lubricant contained in entire body — no special lubricant required — seal does not depend on lubricant.
- Through-conduit opening — no turbulence — no restriction of flow.
- Parallel expanding gates — seal directly across both seats with no distortion whatever — positive shut off both sides.
- Oversize bronze renewable seats.
- Combination wipe and seal rings keep the gate clean . . . pressure out . . . grease in.
- Chrome plated gates.
- Double roller thrust bearings on stem for ease of operation.
- Combination plastic-chevron packing — uses no gland or gland follower.

***THIS IS THE NEW - IMPROVED W-K-M FLOW-LINE AND CHRISTMAS TREE VALVE***

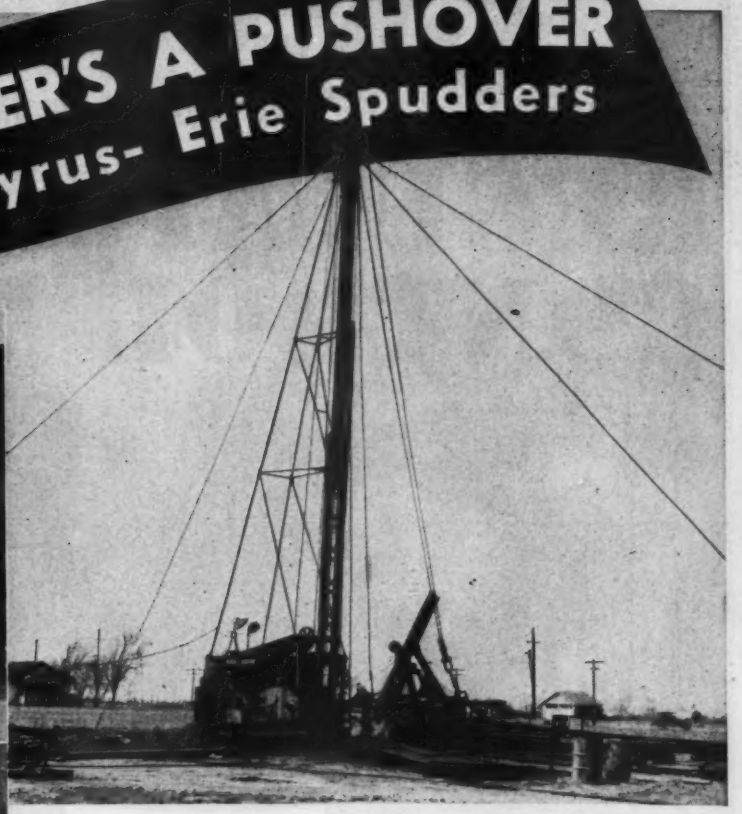
**W-K-M Company**

OIL FIELD, PIPE LINE & INDUSTRIAL EQUIPMENT

HOUSTON, TEXAS, U. S. A.
LOS ANGELES

Cable Address: "WILKOMAC"
Export Office: 30 Rockefeller Plaza, New York

# WORKOVER'S A PUSHOVER
## With Bucyrus-Erie Spudders



ON deepening, tubing and rod servicing, redevelopment, cleanout — over the whole range of workover operations, Bucyrus-Erie spudders offer you the modern mobile way to handle every job fast and effectively. Large fast-spooling reels, big derrick capacity, ample engine power, responsive controls — all add up to economical performance because they save you time in handling tools, bailer, casing, tubing, and rods.

Moving in and setting up is accomplished with a minimum of down-time, too. Bucyrus-Erie spudders with semi-trailer or skid mountings travel at normal highway speeds from job to job. Power-raised telescoping derricks on all models make set-ups fast and easy.

For complete details, see your nearest Bucyrus-Erie spudder distributor today. Ask for further information on all four models — 24-L, 28-L, 36-L, and 48-L.

68550

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

**Distributors in All Principal Oil Fields**

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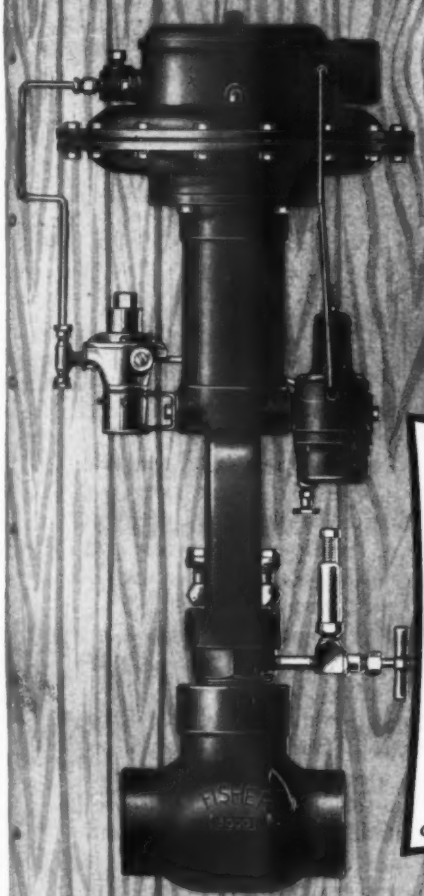
# FISHER

"PACKAGED"

# REGULATORS AND CONTROL VALVES



WIZARD

*ONE CONNECTION*

HOOK-UP

Integrally mounted Wizard Pilot-operated pressure controller, requiring only one field connection.

*"FACTORY PIPED"*

DIAPHRAGM MOTOR VALVE WITH AIR-SET AND POSITIONER

Only 2 connections to make—from operating medium supply and controller.

**Advantageous for installations in industrial process plants, gas pipe-line regulating stations and oil field applications. Saves time and expense ordinarily involved in handling usual piping accessories and piping details. Essential parts cannot be misplaced or incorrectly applied.**

## FISHER GOVERNOR CO.

MARSHALLTOWN, IOWA

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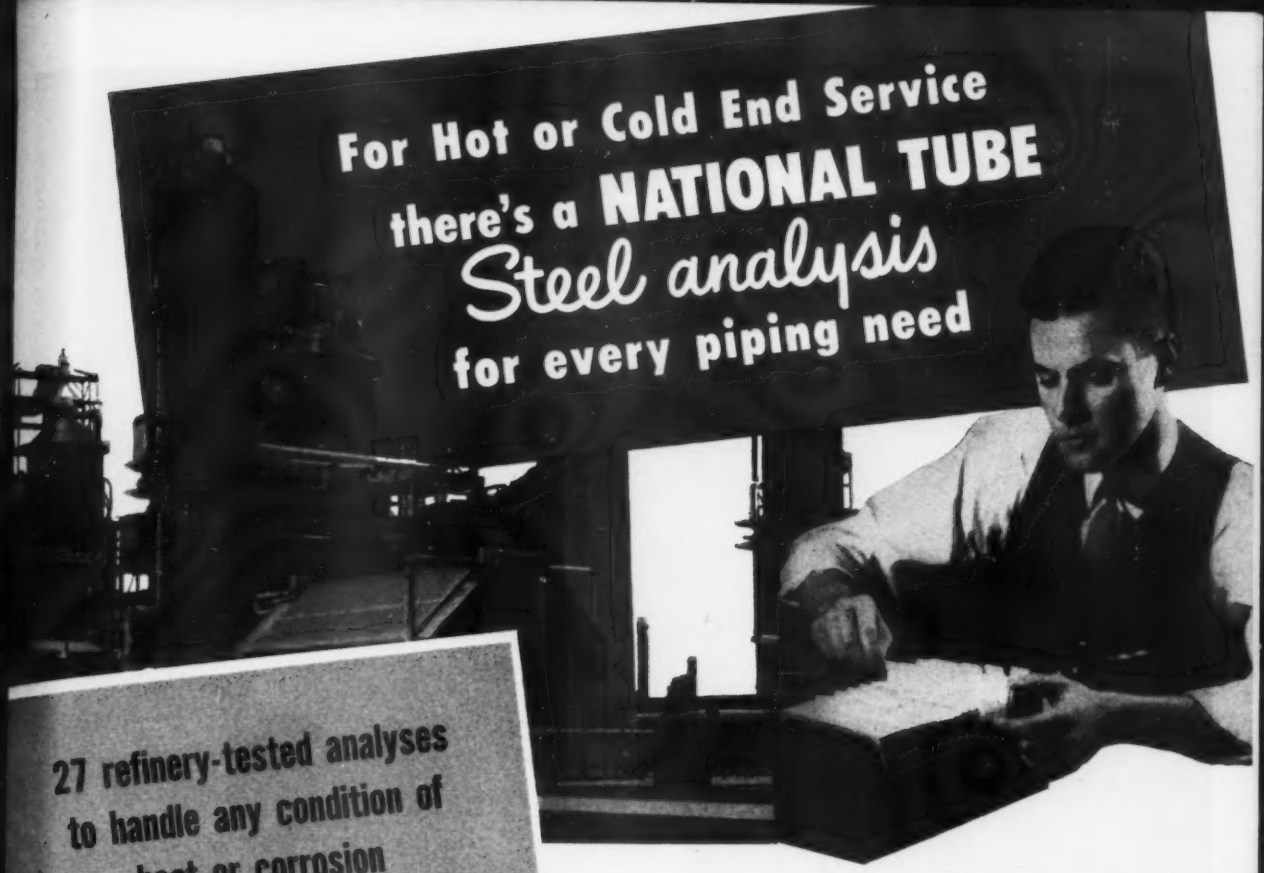
# For Hot or Cold End Service there's a NATIONAL TUBE *Steel analysis* for every piping need



## 27 refinery-tested analyses to handle any condition of heat or corrosion

| | |
|---|---|
| Low Carbon | 7 Cr, ½ Mo |
| Low Carbon, ½ Mo | 8 Cr, ½ Mo |
| Low Carbon, 1 Mo | 8 Cr, 1 Mo |
| ½ Cr, ½ Mo | 9 Cr, ½ Mo |
| 1 Cr, ½ Mo | 9 Cr, 1 Mo |
| 1¼ Cr, ½ Mo | 12 Cr, Al |
| 2 Cr, ½ Mo | 17 Cr |
| 2¼ Cr, 1 Mo | 27 Cr |
| 2½ Cr, ½ Mo, ¾ Si | 18-8 |
| 3 Cr, ½ Mo, 1¼ Si | 18-8 Ti |
| 3 Cr, 1 Mo | 18-8 Cb |
| 5 Cr, ½ Mo | 18-8 Mo |
| 5 Cr, ½ Mo, 1½ Si | 25-20 |
| 5 Cr, ½ Mo, Ti | |

IN hot end service—elemental sulphur, hydrogen sulphide and mercaptins can cause real trouble—particularly if salt is present, and when pressures and temperatures are high.

Cold end service can be even worse: In addition to the sulphur compounds in charging stock, we find hydrochloric acid, sulphuric acid, sulphurous acid and many organic acids. And, if polymerization has been used, the cold end products may contain entrained sulphuric and phosphoric acid.

Here's the point: varied as your experience may be, you can't go wrong if you get free advice from the world's largest manufacturer of tubular products—National Tube Company. We have a tremendous file of case histories that deal with practically every known condition or *combination* of conditions that cause premature pipe and tubing failure. There's a good chance that your problem is a matter of recorded history in our files—solved by one of our 27 refinery-tested analyses.

In the event that yours is a totally *new* condition, our long experience will be of great help in selecting the proper alloy to do your particular job.

**NATIONAL TUBE COMPANY, PITTSBURGH, PA.**
*(Tubing Specialties Division)*
COLUMBIA STEEL COMPANY, SAN FRANCISCO
PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

**NATIONAL SEAMLESS PIPE AND TUBES**

UNITED STATES STEEL

XUM

# HERE ARE ALL THE FEATURES YOU'RE LOOKING FOR

**THE CYLINDRICAL PLUG of an a.c.f. type valve needs no lifting from a tapered seat:**

- Quick operation, if needed
- A quarter turn—full flow
- A quarter turn—full shut-off
- Straight-through flow—most desirable
- *Round* full pipe area port*—no restriction
- No exposed seats when on flow—no abrasion
- Lubricated—for long life and corrosion protection.

*Can be supplied in rectangular port with full area.

a.c.f. CYLINDRICAL FULL PIPE AREA LUBRICATED **PLUG VALVES**

Representatives in more than 50 principal cities.

Write for catalog 4-OG describing types and sizes to: American Car and Foundry Company, Valve Division, 1501 Ferry Ave., East Detroit 2, Mich.

YOU CAN BE **SURE**.. IF IT'S

# Westinghouse

*Compare it on ANY count*

## It's DOUBLE safe!

With Type E turbines, you can be doubly sure of protection against overspeed.

A sensitive, powerful centrifugal-weight governor, enclosed in a specially shaped housing, provides extremely accurate speed control.

However, if for any reason the governor loses control, Type E *dual* protection takes over. A corrosion-resistant, spring-restrained weight, mounted in the governor hub, strikes a trip linkage . . . instantly closes the governor valve and an independent steam inlet butterfly valve. Steam is cut off positively . . . danger is avoided.

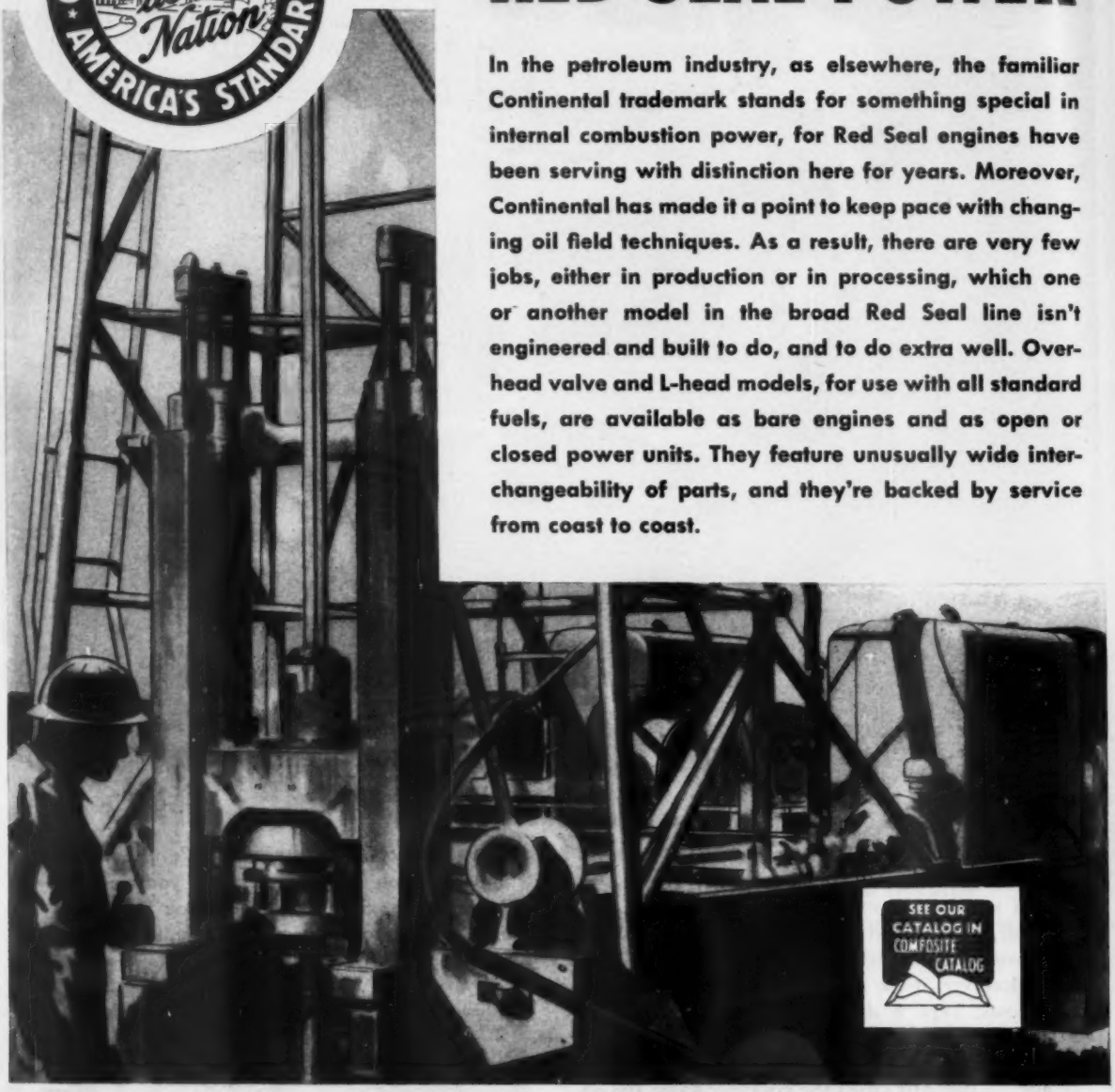
Dual protection is but one of the many significant features of Type E turbines. We invite your comparison on *any* count. Ask your nearby Westinghouse office for 20-page book B-3896, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-50499-A

**Westinghouse**
***TYPE E***
**Turbines**

# FOR EVERY OIL FIELD JOB

## ...CONTINENTAL RED SEAL POWER

**In the petroleum industry, as elsewhere, the familiar Continental trademark stands for something special in internal combustion power, for Red Seal engines have been serving with distinction here for years. Moreover, Continental has made it a point to keep pace with changing oil field techniques. As a result, there are very few jobs, either in production or in processing, which one or another model in the broad Red Seal line isn't engineered and built to do, and to do extra well. Overhead valve and L-head models, for use with all standard fuels, are available as bare engines and as open or closed power units. They feature unusually wide interchangeability of parts, and they're backed by service from coast to coast.**

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**Continental Motors Corporation**
MUSKEGON, MICHIGAN

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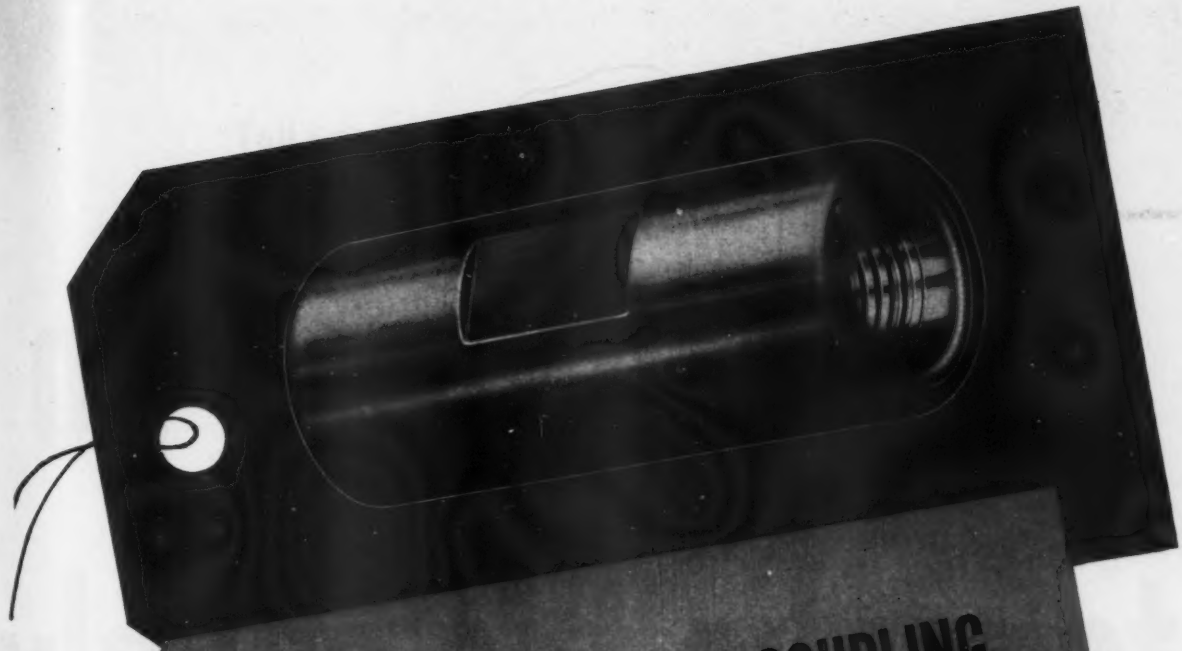

POINT NO. 3 EVERY JONES COUPLING...

is a precision-made product in every respect. A sucker rod string is only as strong as its couplings. Make sure you use JONES.

# JONES

## SUCKER ROD COUPLINGS

*Best in the Field!*

LOOK FOR THE GREEN RODS

**THE S. M. JONES COMPANY**
*Division of Buffalo-Eclipse Corporation*
**General Office and Factory: Toledo, Ohio**
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*Export Sales Office:* Buffalo International Corp.
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# What YOU can do to make the supply of Stainless Steel go further

USS

1

**Tell your supplier the exact purpose the Stainless Steel is intended for and how you plan to fabricate it. Then you will get the *right* steel for the job.**

2

**Minimize your scrap losses by ordering the sizes that will cut to best advantage.**

3

**Indicate, if possible, acceptable alternates in composition, gage, size and finish . . . it may speed up deliveries to you.**

THESE SUGGESTIONS for conserving Stainless Steel are made to assist you during the difficult period we face today. The withdrawal of large tonnages of Stainless Steel—vital for rearmament—make it imperative that supplies of Stainless available for non-military use be made to go as far as possible. This can't be done without the close cooperation of everyone concerned—the steel producer, the steel supplier, and you, the steel user.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND • COLUMBIA STEEL COMPANY, SAN FRANCISCO
NATIONAL TUBE COMPANY, PITTSBURGH • TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM • UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

**U·S·S STAINLESS STEEL**

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

UNITED STATES STEEL

## This Simple Compressor Meets the Complex Needs of a Changing Petroleum Industry

# *It's the Nash!*

Here is a compressor presenting advantages found in no other device. Nash Compressors have only one moving part, rotating without metallic contact with the pump casing. No internal lubrication is required. Yet they produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure.

There are no valves, gears, pistons, sliding vanes, or other complicated wearing parts in a Nash. Compression is secured by an entirely different principle of operation. Because of this, gas pumping problems difficult with ordinary pumps are often easily handled by the Nash. For example, Nash Pumps are standard equipment in the Synthetic Rubber Industry, where they have met the needs of new and difficult processes.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. They maintain original performance over long periods. Service is assured by a nationwide net-work of Engineering Service offices. Instructive bulletin shows how they operate. Write for it.

**One moving part.**

**No internal wearing parts.**

**No valves, pistons, or sliding vanes.**

**No internal lubrication.**

**Low maintenance.**

**Slugs of liquid entering pump do no harm.**

**Non-pulsating pressure.**

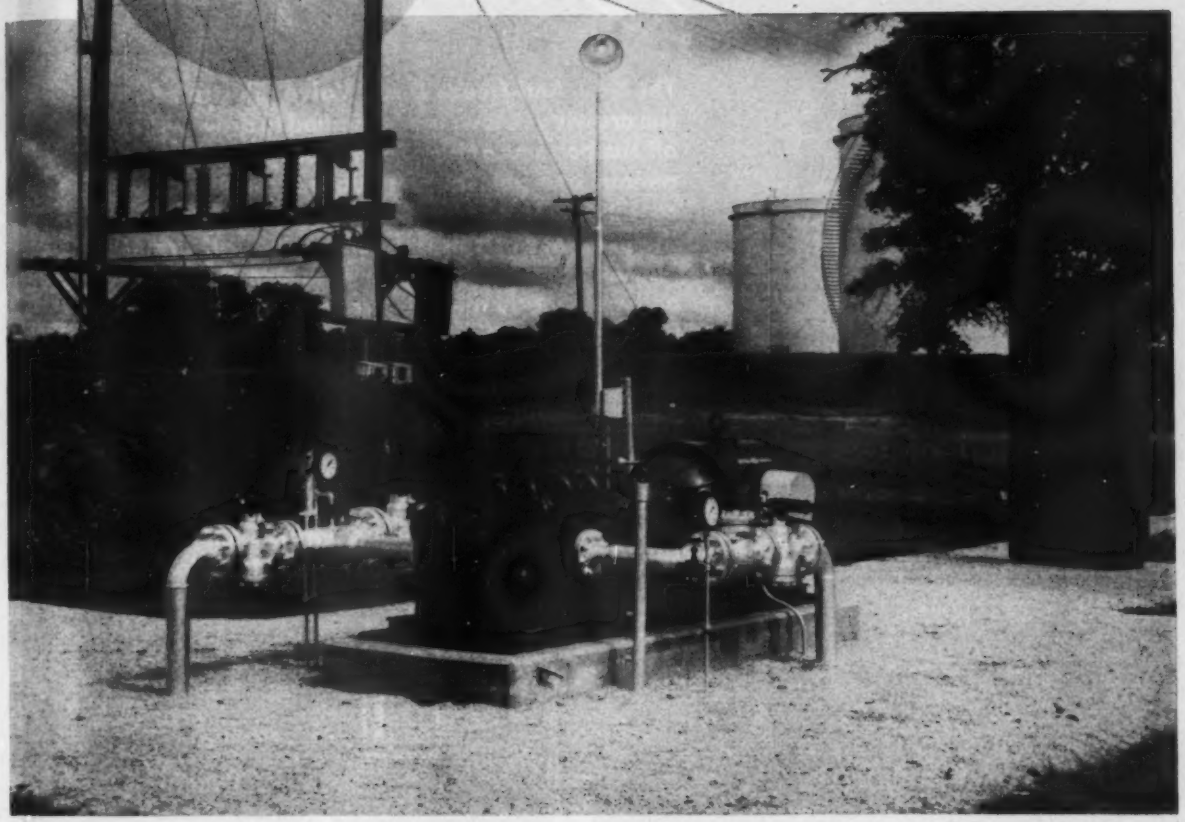
**Saves floor space.**

**75 pounds in a single stage.**

**NASH ENGINEERING COMPANY**

**273 WILSON, SO. NORWALK, CONN.**

# Electric Power
## IS DOING IT FOR LESS!



Yes, *PEP is on the job, giving reliable, economical service. Notice the absence of grease and oil around this modern, neat pipe line pumping unit located at Osage, Oklahoma, and used by a major Pipe Line Company. Your Power Company is now better equipped to render excellent and speedy service. Get the cost facts. Call the Power Engineer of your nearest Utility Electric Power Company. He'll show you how you can save money while enjoying better performance through the use of Purchased Electric Power.

*PEP — Purchased Electric Power

**Petroleum Electric Power Association**

ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

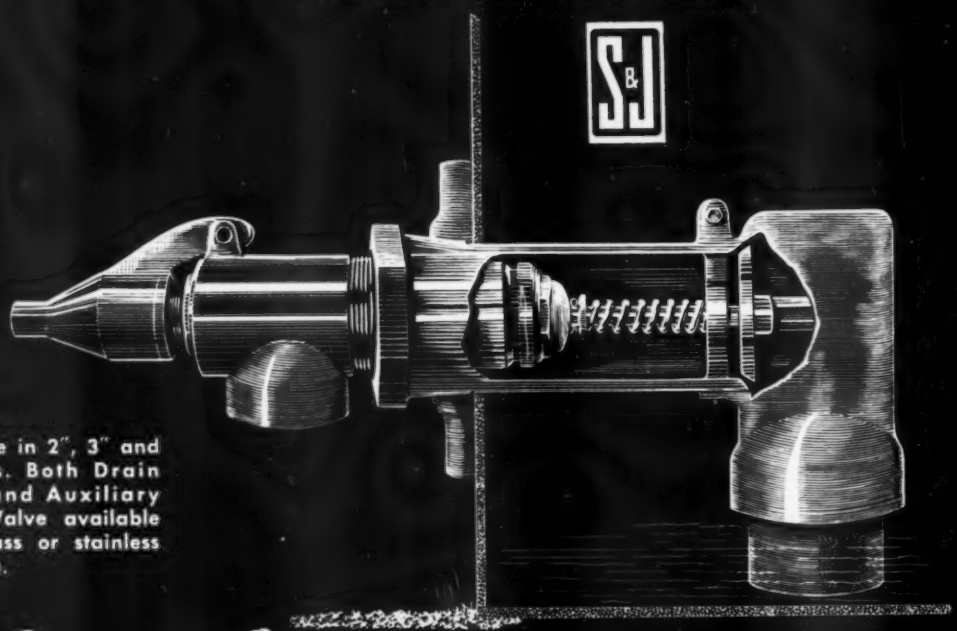
CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS

Or Write to P. O. Box 131, Dallas, Texas

# Operation *Simplified*

The S&J Anti-Freeze Drain Valve, illustrated in the drawing below, was designed to draw water off the bottoms of petroleum storage tanks, and remain operable during sub-freezing weather conditions. This is accomplished by constructing the internal parts of the valve to be self draining. If water will not remain inside the valve body, obviously the valve cannot freeze up and become inoperative.

In the illustration of Model ST-2001-AV shown below, the Anti-Freeze Drain Valve is screwed into an auxiliary shut-off adapter sleeve, which permits removal of the valve from the tank without having to drain its contents. With the valve functioning, manual operation opens the auxiliary to give full flow characteristics; closed, the auxiliary is also self draining.




Available in 2", 3" and 4" sizes. Both Drain Valve and Auxiliary Safety Valve available with brass or stainless steel trim.

*Shand and Jurs Co.* 917 CARLETON STREET · BERKELEY · CALIFORNIA

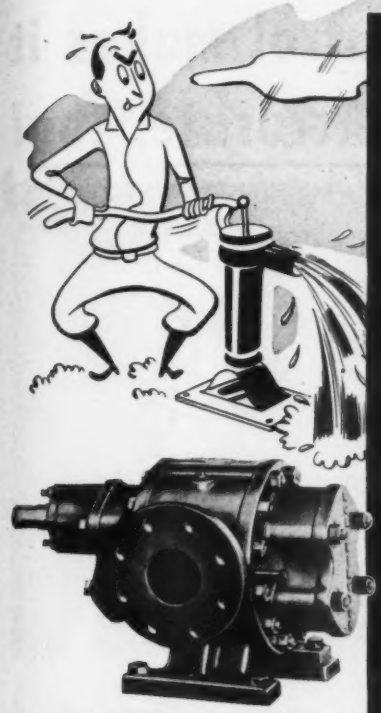
NEW YORK 295 Madison Ave. · CHICAGO 10409 S. Western Ave. · HOUSTON 814 M & M Bldg. · TULSA 310 Thompson Bldg. · LOS ANGELES 714 W. Olympic Blvd. · SEATTLE 3000 Western Ave.

MONTREAL, QUE. 360 Notre Dame St. West · VANCOUVER, B. C. 550 Beatty St. · FORT ERIE Ontario · DARLINGTON England

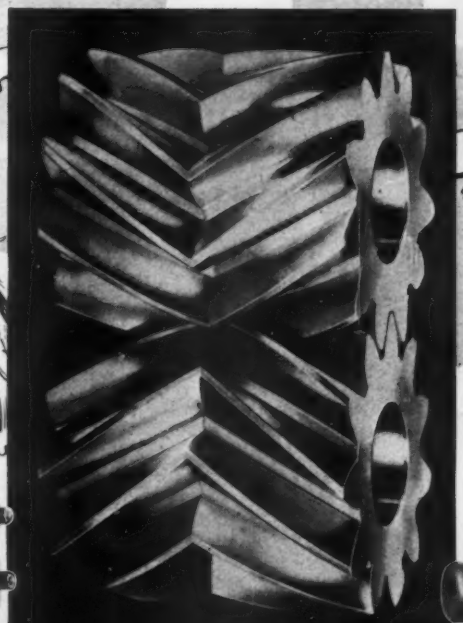
XUM

XUM

# Whether you're pumping *a lot . . . or . . . a little*



**TYPE GR ROTARY PUMP**
Up to 5000 gpm and 500 psi



**Both Pumps Have These** double helical herringbone gear rotors. Sturdy, quiet and efficient; extra large wearing surfaces; no axial thrust; no trapping of liquid.

**TYPE GA ROTARY PUMP**
Up to 50 gpm and 100 psi

## You can't beat this pair for ruggedness!

Or for trouble-free performance either — because, husky as they are in every detail of construction, they're the smoothest-pumping rotaries you ever hooked up! Both the heavy-duty Type GR and the light-duty Type GA have the special herringbone rotors that handle the widest range of liquids—hot or cold, thin or viscous—with steady, quiet efficiency. And each, in its own capacity range, is the soundest investment you can make for years of dependable, low-cost pumping service . . .

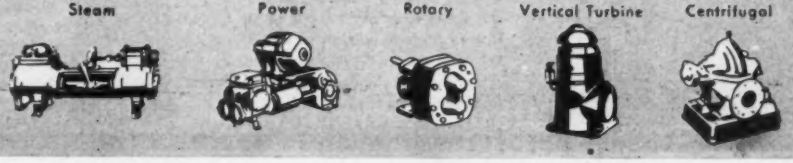
Get proof that *there's more worth in Worthington.* Write for further facts about these pumps to *Worthington Pump and Machinery Corporation, Reciprocating Pump Division, Harrison, New Jersey.*

MEMBER

**WORTHINGTON**

P0.4

**THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB**

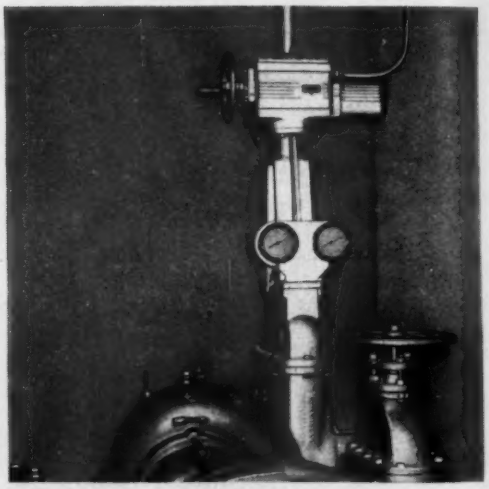


**The principle of the unique Thrust Controlled Seating feature of C-H THY operators**

During seating movement, Fulcrum is at A and drive is *down*, toward the valve seat. At moment of tight seating, Fulcrum *transfers* to B and further drive is *upward*, absorbed harmlessly by the springs to trip the Thrust switch and disconnect the motor.

# *Automatic Valve Operation?*

# Thrust Control makes it Safe and Accurate, too!



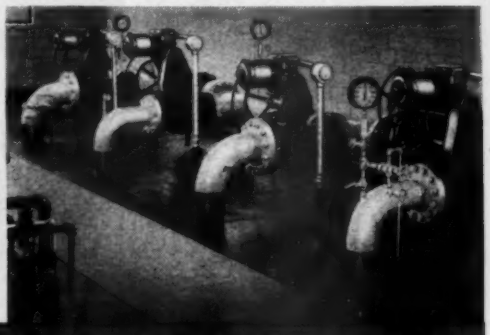
Exclusive Cutler-Hammer Thrust Control Valve Operators from few pounds thrust up to 80 TONS can be applied to any gate valves in the petroleum industry.

For valves which do not seat, such as the plug type valves, C-H B2 automatic declutching valve operators act swiftly and stop instantly.

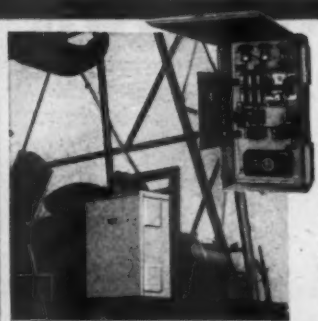
IN THE petroleum industry, automatic, instant and swift motorized valve operation is an economic "must." Distance, difficulty, frequency of operation and danger are factors that urge such a step.

But the problem is also one of *accurate* and *safe* seating . . . as assured by the Thrust Control principle employed exclusively in Cutler-Hammer Valve Operators. The motor *positively* drives the valve disc home. During the driving period, the fulcrum is established at the yoke nut by heavy steel springs which exactly balance *tight seat pressure*. Therefore, at the very instant of desired tight seating, the driving fulcrum transfers to the seat of the valve, hence any further drive is into the yoke nut, against the heavy springs which harmlessly absorb motor drift. The movement of the yoke nut against the springs trips the *THRUST* switch to disconnect the motor. The amazing part is that the same degree of tight seating is maintained no matter how much valve parts may expand or contract. No other valve operator has or can have this direct *THRUST* controlled feature. No other valve operator can be as safe and sure and accurate. CUTLER-HAMMER, Inc., 1453 St. Paul Avenue, Milwaukee 1, Wisconsin.

CUTLER-HAMMER
VALVE CONTROL
C-H



## OTHER CUTLER-HAMMER PRODUCTS FOR THE OIL AND GAS INDUSTRY



**Long-lasting control that "schedules" oil well pumping**

This Cutler-Hammer Motor Control Device built to the rigid requirements of tough oil country service automatically starts pump going and shuts it down in synchronization with oil well capacity or in conformity to operating schedule. You can set up any sequence of day and night operation, set it to skip certain days. Bulletin 9589D-21 tells all about this amazing pumping control. Send for free copy.

**Know what you are buying, selling, giving away**

*These "gas counting" instruments tell you accurately*

Cutler-Hammer Calorimeters . . . standard wherever gas is bought or sold—actually count the B. t. u.'s per cubic foot of the gas you are sending or receiving. Accurate within 1%. They also write a continuous 24-hour a day permanent record so you know at all times exactly what is going through your piping system . . . for accurate accounting and billing, and for accurate control of gas heating value. Free booklet "Where Experience Counts" tells all about C-H B. t. u. Control.

# If you're all "gummed up"

## in a tough heat transfer problem

## Specify..

Vogt Spiral, Spring Type Scraper
Patent No. 2,117,175

# Vogt

SCRAPER TYPE

# CHILLERS

Photos show shop assembly without driving motor.

Fouling of the inner pipe surfaces of Vogt Chillers is eliminated, because they are swept clean continuously during operation by patented spiral, spring type scrapers. And these clean surfaces achieve the highest possible rate of heat transfer between the solution and the refrigerant.

**VOGT DOUBLE PIPE TYPE CHILLERS** are designed to use ammonia, brine, or cold dewaxed oil as the cooling medium. Oil or brine, when employed, is circulated through the jacket pipes countercurrent to the flow of the solution in the inner pipes.

**MULTI-PIPE TYPE CHILLERS**, for direct expansion, have large jacket shells each containing seven inner pipe sections and employ volatile refrigerants such as ammonia, freon, propane, etc.

*Our engineering staff is qualified by training and experience to help you find the right answers to your heat transfer problems. Their recommendations are available without obligation.*

Vogt FOR BETTER CHILLERS

## HENRY VOGT MACHINE CO.

INCORPORATED

LOUISVILLE 10, KENTUCKY

BRANCH OFFICES NEW YORK, PHILADELPHIA, CLEVELAND, CHICAGO, ST. LOUIS, DALLAS

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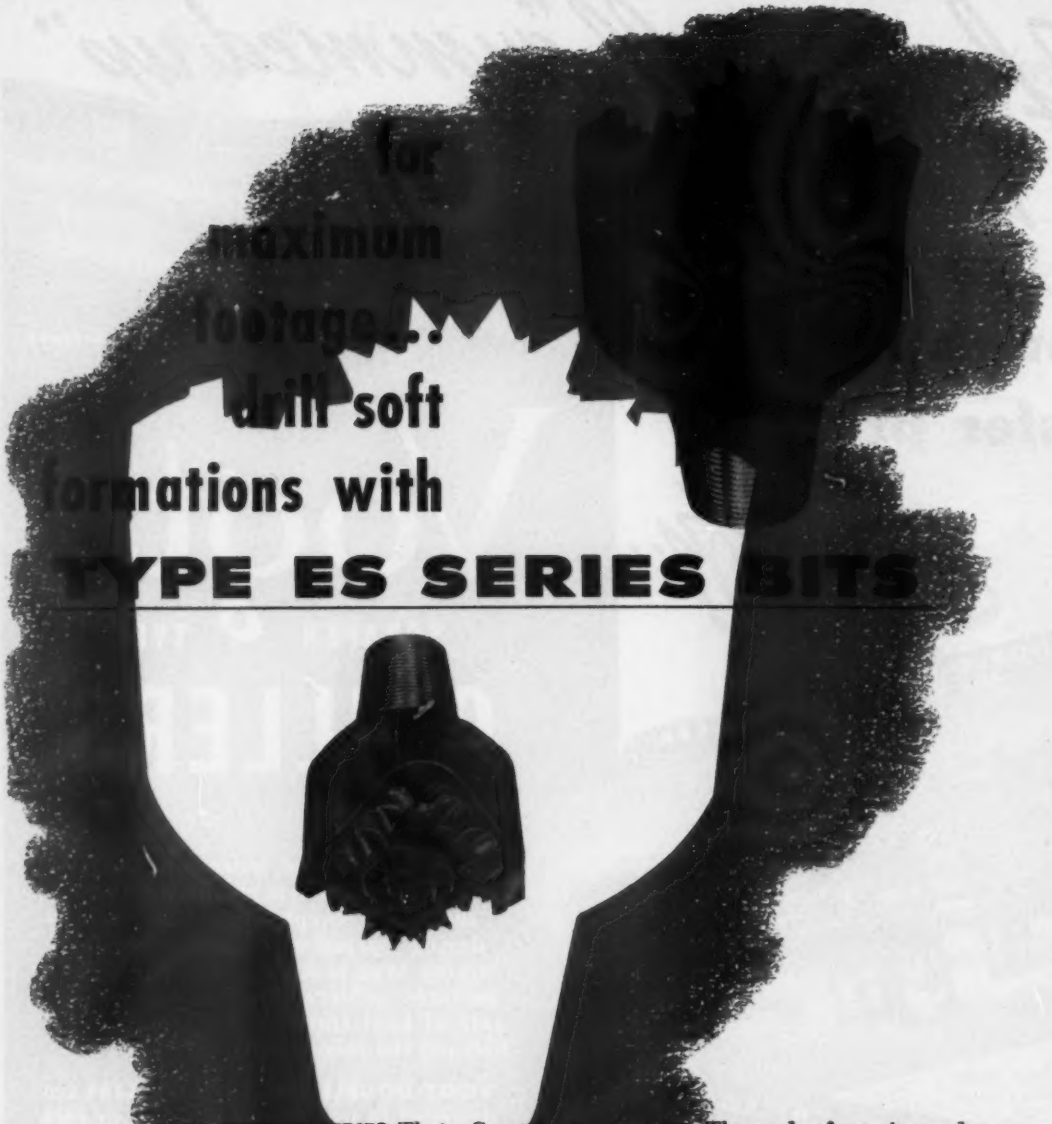


**TYPE ES SERIES** Three Cone [illegible] but highly efficient in the [illegible] shales, anhydrite, soft limestones, and broken formations where occasional hard streaks are interspersed with softer rock.

The sturdy teeth, with a substantial bearing, permit safe use of heavy [illegible] The angle of rotation and cone offset combine to give the sliding, tearing action essential for lightweight drilling.

CP Rock Bits are furnished in types and sizes to meet the specific drilling requirements of different oil fields. Prompt service is assured in the Mid-Continent, Rocky Mountain and Canadian fields.

**CHICAGO PNEUMATIC TOOL COMPANY**

MANUFACTURED AT FRANKLIN, PA.

GENERAL & EXPORT OFFICES: 6 EAST 44th STREET, NEW YORK 17, N. Y.

Oil Tool Sales Office: One N. W. 16th Street, Oklahoma City, Oklahoma
In Canada: 10103 Eighty-First Avenue, South Edmonton, Alberta, Canada



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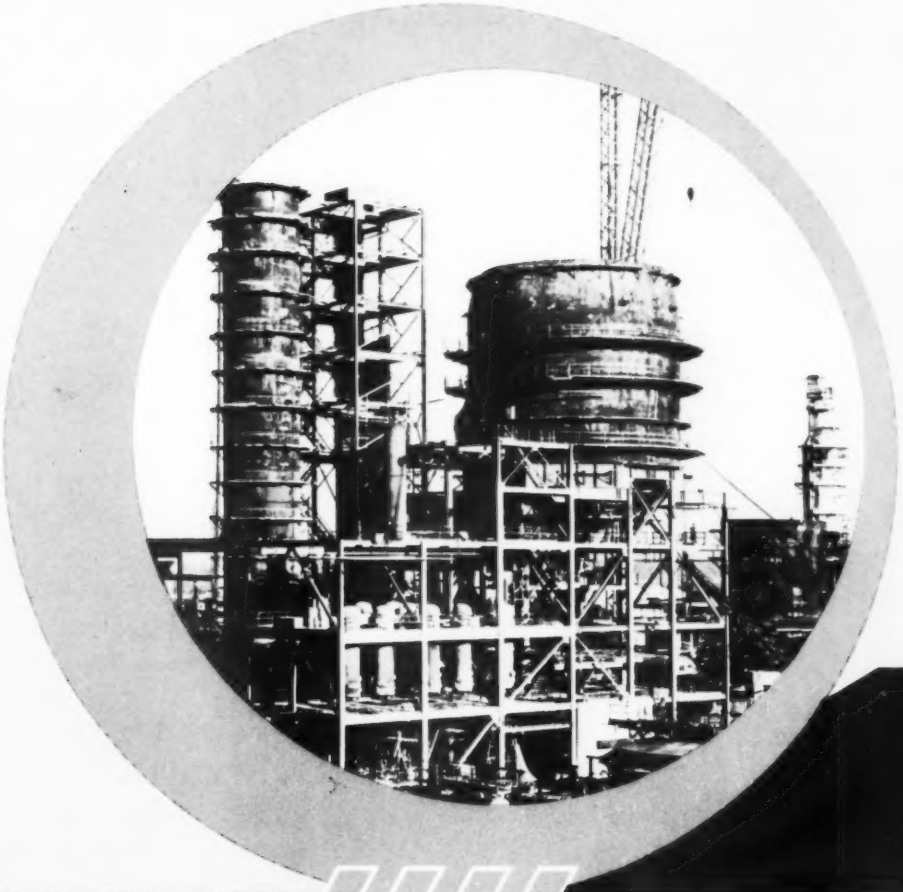
## geared for a fast "on stream"



**the complete engineering and construction service.**

getting the unit up-fast—and running
—is the major objective of the complete
engineering and construction service—

# FOSTER WHEELER CORPORATION

165 BROADWAY, NEW YORK 6, NEW YORK

Construction is well ahead of schedule on this Fluid Catalytic Cracking Unit designed by Foster Wheeler for the Pan-Am Southern Corporation. The photograph shows status of job six months after start of construction.

# FOSTER WHEELER CORPORATION

165 BROADWAY, NEW YORK 6, NEW YORK

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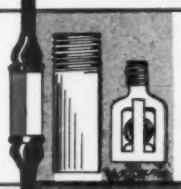
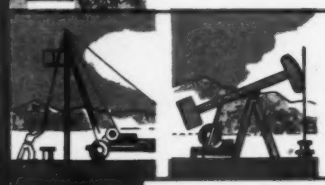
# CONSERVE STEEL, AVOID LOST PRODUCTION, with KONTOL

**KONTOL** *conserves steel*



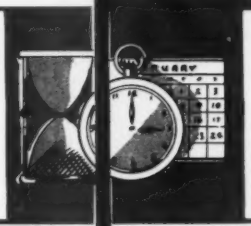
Kontol Corrosion Preventive mixes with the well fluids and adsorbs on the metal surfaces of production equipment as a tough film. This Kontol film prevents attack by corrosive elements, prolonging the useful life of production equipment.

**KONTOL** *prevents production stoppages*



By preventing corrosion damage, Kontol helps to keep wells on production. Some wells now treated with Kontol stay on the pump for six months without a shutdown—they formerly were down once a month or oftener.

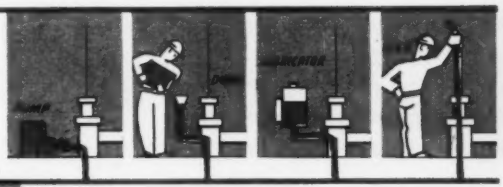
**KONTOL** *saves time*



Saving of lease time is the result of the many advantages of Kontol. Of course, keeping the well on production is the most outstanding, but there are many others. Kontol is easy to use, this fact alone is a time-saver. The use of Kontol does not complicate demulsification procedures. Kontol does not deposit precipitates which may plug producing or water disposal formations.

**KONTOL** *is easy to use*

Kontol is simple to use. It can be pumped, dumped, lubricated or dropped down the well in solid stick form.



**KONTOL** *is safe to use*

Kontol is non-poisonous, it does not give off offensive or dangerous fumes. No bulky protective equipment such as aprons, gloves, goggles or masks are required in its handling.

**KONTOL** *does not complicate production routine*

Kontol does not cause emulsion difficulties. Emulsified crudes from Kontol-protected wells respond to the usual demulsification procedures. Kontol does not deposit precipitates which may plug producing or water-disposal wells.

**KONTOL**

A PRODUCT OF THE **TRETOLITE COMPANY**

ST. LOUIS 19, MISSOURI • LOS ANGELES 22, CALIF.

*Chemicals for the Petroleum Industry*

***CORROSION INHIBITION • DEHYDRATING • DESALTING***

***SCALE PREVENTION • WATER DE-OILING • PARAFFIN REMOVAL***

K51

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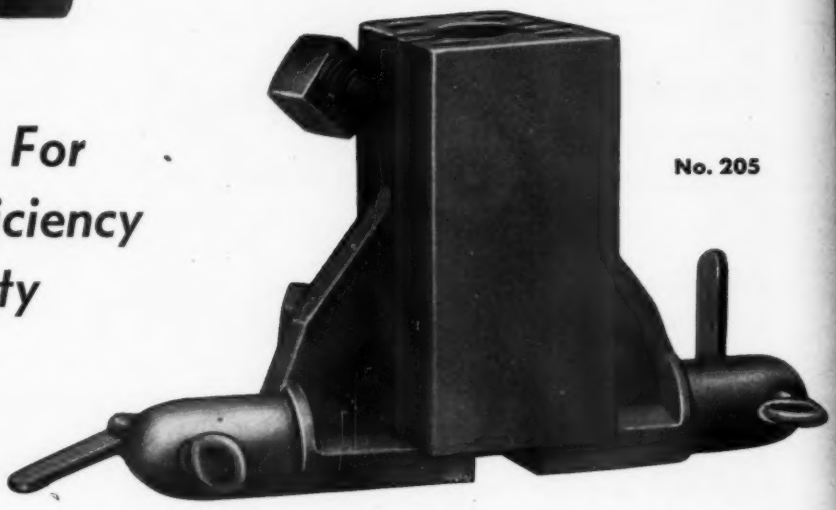
No. 204

# Strong, Rugged

## RATIGAN POLISH ROD GRIPS



No. 205

## *Engineered For Maximum Efficiency and Safety*

**Modern, improved grips for use with modern, unitized pumping equipment . . . two of the famous Ratigan "Sure-Grip" products, recognized leaders in every oil field.**

The Ratigan No. 204 and No. 205 are our latest improved Polished Rod Grips, designed to accommodate present types of unitized pumping equipment which require a short and narrow gripping device of high capacity. Although actually smaller and lighter in weight (weighs only 19 pounds) these grips have 30% greater holding capacity. The No. 204 costs less and the No. 205 costs no more than previous types (see table).

The No. 204 will accommodate most of the pumping units having carrier bars, usually supplied by the manufacturer. The height of this grip is less than that of the No. 7, one of our former popular screw-type grips; the body is about half as wide; and it weighs considerably less.

The No. 205 is a combination grip and carrier bar, and will accommodate centers from 8" to 10". We recommend using this grip with the Ratigan No. 219 Wire Line Clamps. The No. 219 clamp is especially adapted to the trunnions on the No. 205, and also is used extensively on all types of wire line horseheads.

Both types consist of three parts; the body, connecting block, and gate. Both are identical except that the No. 205 is provided with trunnions which allow more flexibility of the wire line between the trunnions and the bottom of the horsehead, and will prolong the life of the cable. (Trunnions should be at the bottom when operating). The No. 219 Wire Line Clamp eliminates babbitting, and keeps the lines in the center of both the grip and the polish rod, where they should be.

A comparison of the No. 204 and No. 205 with two of our major screw-type grips is given in the following table:

| Type | Approx. Holding Capacity | Approx. Weight | Price |
|---|---|---|---|
| No. 7 2-Screw | 37,000 lbs. | 30 lbs. | $25.00 |
| No. 50 3-Screw | 53,000 lbs. | 45 lbs. | 35.00 |
| No. 204 2-Screw | 53,000 lbs. | 19 lbs. | 25.00 |
| No. 205 2-Screw (Trunnion) | 53,000 lbs. | 28 lbs. | 35.00 |

**All Ratigan Products are illustrated and described in the latest edition of the Composite Catalog**

## J. P. RATIGAN, INC.

1213 Santa Fe Avenue, Los Angeles 21, California

**Export: National Supply Export Corporation, 30 Rockefeller Plaza, New York, N. Y.**

**RATIGAN PRODUCTS ARE SOLD THROUGH LEADING SUPPLY STORES**



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Price
$25.00
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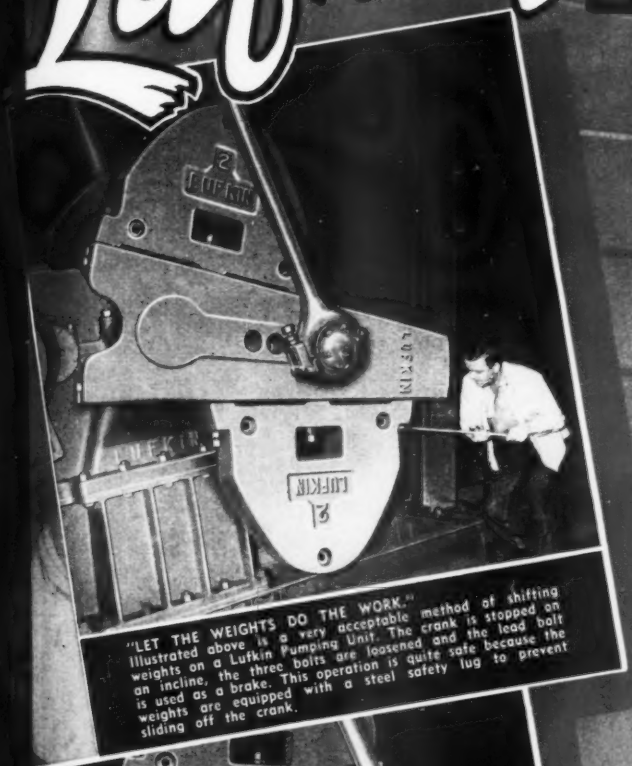
# Lufkin PERFECTION

## . . . . IN CRANK COUNTERBALANCING

The Lufkin Trout Crank gives perfect counterbalance adjustment from minimum to maximum effect with the greatest of ease. One man can easily do the job. Two methods are illustrated herewith. Any method of moving the weights is safe because the weights are equipped with steel safety lugs to prevent sliding off the crank.

Operators find the Lufkin Trout Crank superior for oil field pumping units because of these outstanding features:

1. **EASE OF ADJUSTMENT**—one man can counterbalance a well.
2. **SAFETY**—a steel safety lug prevents the weights sliding off the crank.
3. **PRECISION** — counterbalance of minimum to maximum effect can be obtained by moving weights in a straight line.
4. **SIMPLICITY**—only three bolts to loosen.




"LET THE WEIGHTS DO THE WORK." Illustrated above is a very acceptable method of shifting weights on a Lufkin Pumping Unit. The crank is stopped on an incline, the three bolts are loosened and the lead bolt is used as a brake. This operation is quite safe because the weights are equipped with a steel safety lug to prevent sliding off the crank.

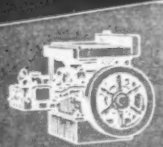
Another acceptable method of counterbalancing a Lufkin Unit is to stop the crank on a slight incline, prying the weight along the machined ways of the crank with the aid of a bar. This method is made easy by the notched bottom of the crank slot, enabling the operator to reach the desired position by an easy sliding motion.

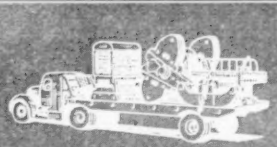
**LUFKIN FOUNDRY & MACHINE COMPANY**
LUFKIN, TEXAS

*Branch sales and service* Houston, Dallas, New York, Tulsa, Los Angeles, Seminole, Oklahoma City, Corpus Christi, Odessa, Kilgore, Wichita Falls, Casper, Wyoming, Great Bend, Kansas.

Lufkin Equipment in CANADA is handled by
THE LUFKIN MACHINE CO., LTD., 14321 108th Avenue, Edmonton, Alberta, Canada

LUFKIN PUMPING UNITS


LUFKIN-COOPER-BESSEMER ENGINES


LUFKIN OIL FIELD AND INDUSTRIAL TRUCK TRAILERS

INDUSTRIAL SPEED REDUCERS AND MOTOR BASES

DIVISION LUFKIN FOUNDRY & MACHINE COMPANY

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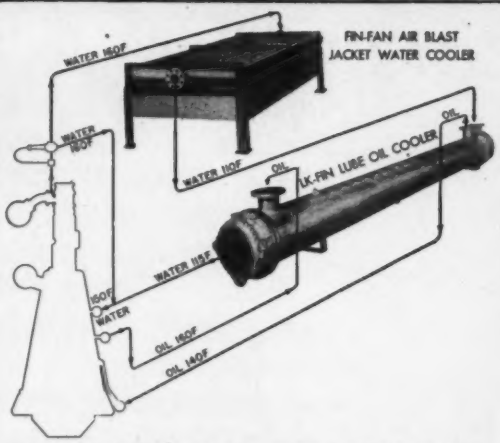
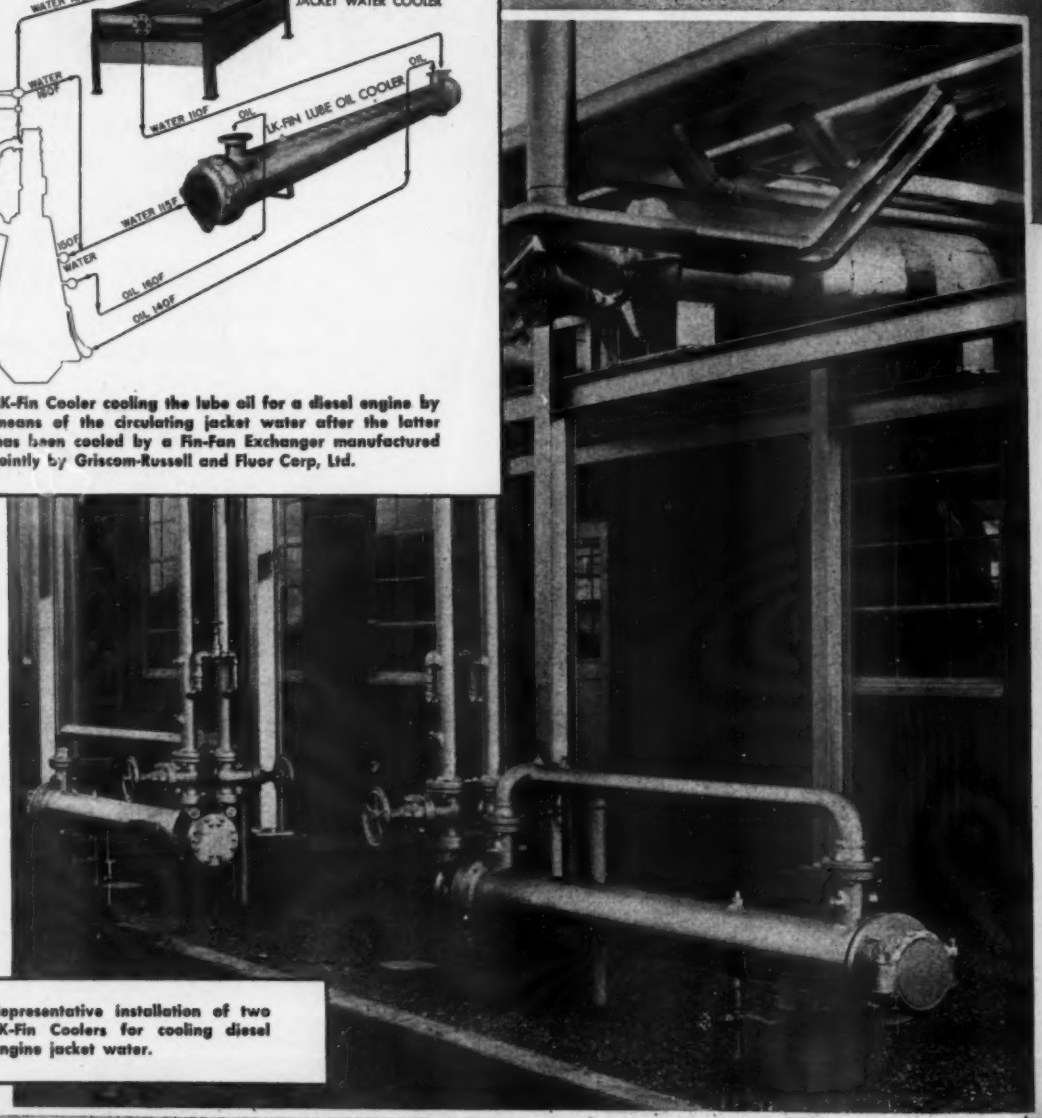
# Why LK-FIN means a more




**LK-Fin Cooler cooling the lube oil for a diesel engine by means of the circulating jacket water after the latter has been cooled by a Fin-Fan Exchanger manufactured jointly by Griscom-Russell and Fluor Corp, Ltd.**



**Representative installation of two LK-Fin Coolers for cooling diesel engine jacket water.**

GRISCOM-RUSSELL: PIONEERS IN HEAT TRANSFER APPARATUS

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# effective, compact, economical LUBE OIL OR JACKET WATER COOLER

It's because of the *fins* on the cooling elements. These fins greatly increase the external heat transfer surface . . . enable a considerably shorter tube to perform the same cooling effect that requires a much longer bare tube.

The results . . . a more compact cooler because of the more effective heat transfer surface . . . a more economical unit because of the shorter tubes and shell.

What diameter . . . thickness . . . pitch . . . should the fins be to accomplish these results? That's where G-R's unmatched know-how comes in . . . a knowledge gained from 20 years of experience in building *finned-type* heat exchangers and the results obtained from many tens of thousands of installed finned-tube units.

And the exclusive use of LK-Fin tubes is only one of the many distinctive features of these coolers. Write for bulletin describing them in detail, with rating tables and selection data.

THE GRISCOM-RUSSELL CO., 285 MADISON AVE., NEW YORK 17, N. Y.

GRISCOM-RUSSELL

GR 262

GRISCOM-RUSSELL: PIONEERS IN HEAT TRANSFER APPARATUS



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Whether you want one worm-gear speed reducer or a thousand, a standard drive or a unit designed to meet special problems, Cleveland can serve you better.

# "Cleveland" is the standard in worm gearing

● When you specify "Clevelands—or equal," you can be confident that you are getting the finest in worm-gearing.

The uniform dependability that has distinguished Clevelands through 38 years has established "Cleveland quality" as the measure of value in worms and gears. Cleveland sets the pattern through four outstanding features:

1. *Correctness of design*—proved by years of performance.
2. *Finest of materials*—selected on the basis of long experience and research.
3. *Modern manufacturing facilities*—kept up-to-date by a policy of continuous replacement.
4. *Precision workmanship*—by machinists and other production workers, trained as craftsmen.

Cleveland offers a complete line of worm gear sets and speed reducers, including the popular fan-cooled Speedaire —to meet the needs of any machinery or equipment builder or user. Representatives in all major industrial centers are at your service. Write for our current catalog.

The Cleveland Worm & Gear Company, 3286 East 80th Street, Cleveland 4, Ohio.

*Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.*

CLEVELAND

*Drives*

# MARTIN-DECKER

## presents the sensational *New*

# TYPE "F"

## for Masts and Small Rigs

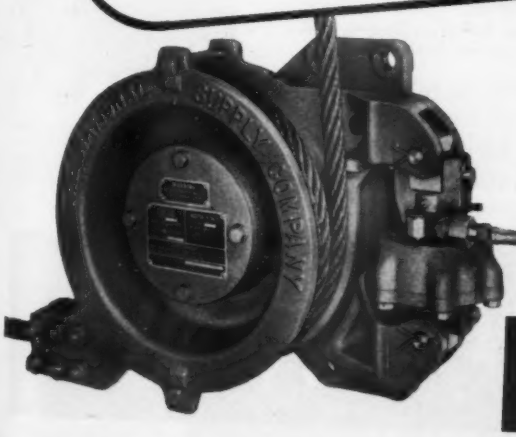
***Materially lower in cost than the famous Type "D", The Anchor is... Half the size... Half the weight... Two thirds the capacity***

*Check these outstanding features of the*

**TYPE F MARTIN-DECKER WEIGHT INDICATOR with the TYPE F IDEAL Wire Line Anchor**

- Provides convenient side mounting for derrick or mast leg installations.
- Accommodates any line size up to and including 1¼"
- Rated for 40,000-lb. dead line load (400,000 lbs. with ten lines)
- 12" gauge dials graduated for 4, 6, 8, 10 lines
- Dials show net-weight-on-the-bit directly in pounds or kilos
- Has a vernier weight indicator
- Unaffected by temperature and fluid volume changes
- No adjustment for cable size or number of lines strung

**The Type "F" possesses all the revolutionary advancements found in the famous Type "D."**




The Martin-Decker Type "F" Weight Indicator and National Supply's Ideal Wire Line Anchor (like the Type "D" and the Type "E") combine a snubbing drum having a lever arm which is pivotally mounted on Timken bearings. The wire line pull transmits a rotational force to the snubbing drum which actuates the Pressure Transformer. The dead line load is transformed to Hydraulic Pressure by the lever and Pressure Transformer combination and is transmitted to the gauge at the driller's position through high-pressure synthetic rubber hose. The Anchor and Weight Indicator combination directly supports the load. This combination materially simplifies Wire Line Anchoring and Weight Instrumentation. It provides an accurate, sensitive and dependable Weight Indicator with extreme ruggedness.

*Write for descriptive folder.*

**Sold through your supply store.**

HOME OF THE WEIGHT INDICATOR

**MARTIN-DECKER CORP.**

LONG BEACH, CALIFORNIA

SAN JOAQUIN VALLEY: T. J. CULLEN, BAKERSFIELD, CALIFORNIA
MID-CONTINENT DISTRIBUTOR: REED ROLLER BIT COMPANY, HOUSTON, TEXAS
CANADIAN DISTRIBUTOR: REED ROLLER BIT COMPANY OF CANADA, LTD., CALGARY & EDMONTON, ALBERTA

# Avoid "DOWN-TIME" for Maintenance—Standardize on the POWELL LINE

When you buy a valve, ask yourself these two questions. First, will it operate satisfactorily in the service in which it is to be used? Second, and of most importance, how much *maintenance* will it require? Because, every time maintenance becomes necessary, there's a two-fold cost. One, the cost of labor—and possibly parts—to put it back in working order. Two, the loss of production farther down the line.

And, because Powell Engineers *always* have this in mind, every valve in the *complete* Powell Line* is designed and made to avoid, as far as possible, "DOWN-TIME" for maintenance.

That's why, through the years, Powell Valves have been noted for long, trouble-free performance—even under the most exacting service conditions.

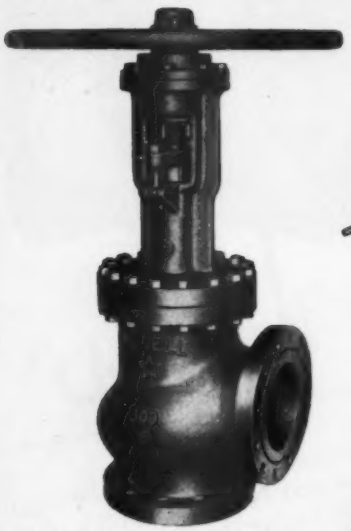


Fig. 3033—Class 300-pound Cast Alloy Steel Angle Valve with flanged ends, outside screw rising stem and bolted flanged yoke. The streamlined areas through the body assure maximum flow with minimum pressure drop. Built to handle temperatures up to 1400 F.

Fig. 6079—(Motor Operated) Class 600-pound Cast Steel Gate Valve for Pipe Line Service. Has flanged ends and bolted flanged bonnet. Classes 150, 300, and 400-pound valves can be furnished. Also available with gears.

Fig. 375 — 200-pound Bronze Gate Valve. Screwed ends, union bonnet, inside screw rising stem and renewable "Powellium" wear-resisting nickel-bronze disc.

Fig. 1793 — Large 125-pound Iron Body Bronze Mounted Gate Valve with flanged ends, bolted flanged yoke, outside screw rising stem and tapered solid wedge.

Fig. 3061—Class 300-pound Cast Steel Swing Check Valve with flanged ends and bolted cap. Disc has ample lift to permit full, straightway, unobstructed flow through the valve body.

***The Complete Powell Line includes Globe, Angle, "Y", Gate, Check, Non-return, Relief, and Flush Bottom Tank Valves in Bronze, Iron, Steel and a wide range of Corrosion-resistant metals and alloys.**

**Ask your nearest Distributor—or write direct**

**The WM. POWELL Co., 2525 Spring Grove Ave.**
**P. O. Box 106, Station B, Cincinnati 22, Ohio**
**DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES**

# POWELL VALVES

# MARKS THE SPOT

**where you need these proved**

## MAGCOBAR PRODUCTS

—a protective colloid and powerful dispersing agent—an excellent pre-treatment for conditioning mud prior to drilling cement.

—a complex phosphate for chemically removing cement contaminants.

—an all-purpose mud-treating chemical which supplements phosphates in reconditioning cement contaminated mud.

—a concentrated colloidal additive for restoring the viscosity and wall-building characteristics.

—a ready-mixed mud in dry form which is resistant to salt and cement contaminants.

## CEMENT CONTAMINATION

Several times during the drilling of every well cement contamination of mud becomes a problem. These Magcobar Products have been proved effective for pre-treating the mud prior to drilling the cement and restoring the desirable drilling qualities to cement-cut mud. When you encounter cement contamination, use these Magcobar materials . . . separately or in combinations . . . to save rig time and money and eliminate the costly practice of discarding cement-cut mud. Your Magcobar field engineer will gladly give assistance at the rig and there are nearly 300 strategically located Magcobar dealers with stocks of these products, ready to serve you day and night.

**MAGNET COVE BARIUM CORP., MALVERN ARK., HOUSTON, TEX.**

***ONE OF THE DRESSER INDUSTRIES***

**Magcobar**

*Complete*

**DRILLING MUD SERVICE**

**DEALER**

# SUPERIOR CAN SUPPLY YOU IN A HURRY!

SUPERIOR covers the mid-continent oil area to serve you *in a hurry!* From Shreveport to the store nearest you, you'll find a well-balanced stock of quality supplies—nationally-known brands you can depend on to do the job. You will also find expert technical advice to help you.

Yes, SUPERIOR covers the field—with a *complete* line of oil, gas, and industrial supplies, pipe and machinery! When you need "on-the-spot" supplies and service, call your nearest SUPERIOR store!

Out of the Shreveport area SUPERIOR'S service department of field engineers and service men overhaul drilling and industrial machinery *in the field.* These men are on call day and night... seven days a week—to assure no loss from "down time."

SUPERIOR maintains a complete machine shop and fabrication plant in Shreveport. Write for SUPERIOR'S booklet, "Save Time and Money." Learn how the "Superior method" of prefabrication can mean efficiency and profits on piping jobs of the oil, gas, chemical and power industries.

IRON WORKS SUPERIOR SUPPLY CO. INC. SHREVEPORT LOUISIANA

SUPERIOR IRON WORKS & SUPPLY COMPANY, INC.

1202-04 MARSHALL STREET • P. O. BOX 1800 • SHREVEPORT, LA.

NEW YORK CITY — TELEPHONE OREGON 9-3650

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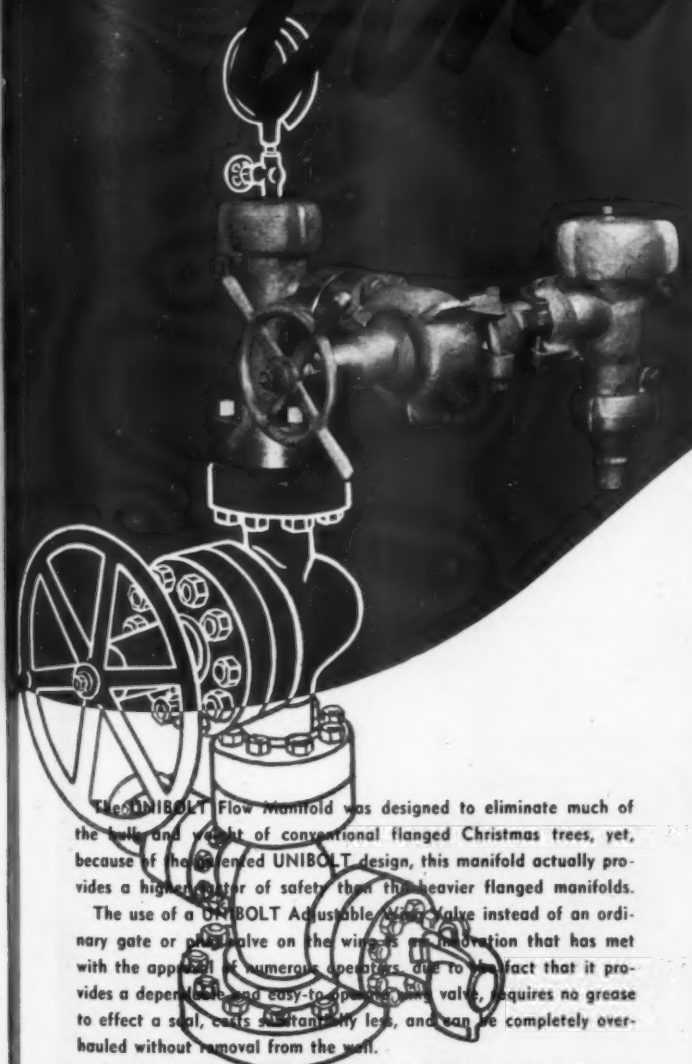
TELL YOUR CHRISTMAS TREE SUPPLIER TO FURNISH

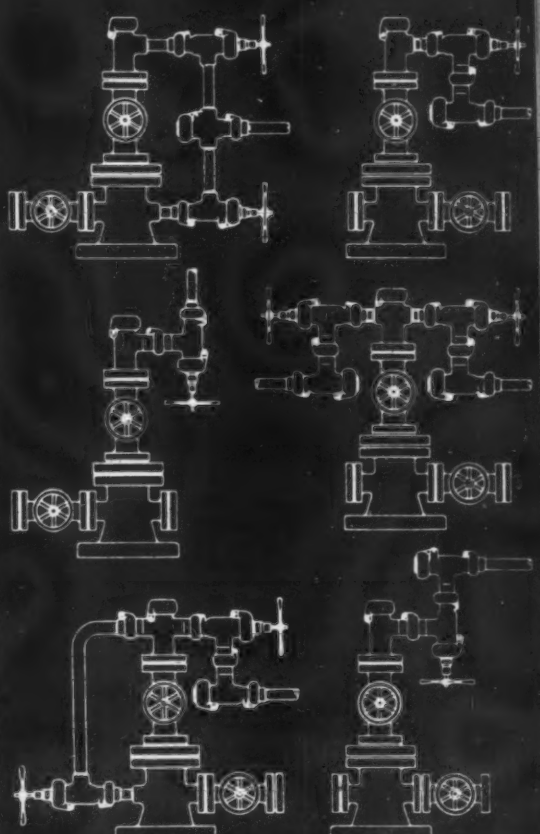
# Unibolt

## FLOW MANIFOLDS

**—THEY MAKE ANY TREE LIGHTER, STRONGER, MORE ECONOMICAL!**



UNIBOLT ADJUSTABLE WING VALVES AND POSITIVE CHOKES MAY BE ASSEMBLED IN ANY DESIRED TYPE OF MANIFOLD TO BEST SERVE INDIVIDUAL WELL REQUIREMENTS



The UNIBOLT Flow Manifold was designed to eliminate much of the bulk and weight of conventional flanged Christmas trees, yet, because of the patented UNIBOLT design, this manifold actually provides a higher factor of safety than the heavier flanged manifolds.

The use of a UNIBOLT Adjustable Wing Valve instead of an ordinary gate or plug valve on the wings is an innovation that has met with the approval of numerous operators, due to the fact that it provides a dependable and easy-to-operate wing valve, requires no grease to effect a seal, costs substantially less, and can be completely overhauled without removal from the well.

Another important advantage of the UNIBOLT Flow Manifold is its complete interchangeability. All connections in the manifold are standard forged steel UNIBOLT Couplings, and any unit in the assembly, or part thereof, may be easily and quickly replaced in the field without removing the manifold from the well.

See your Composite Catalog for complete details, or write direct for literature.

## THORNHILL-CRAVER CO.

**HOUSTON** UNIBOLT **TEXAS**

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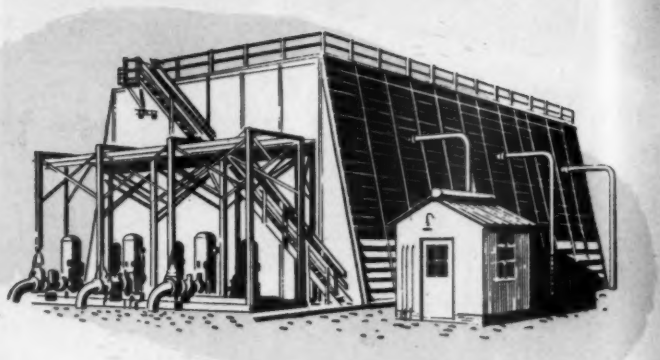
# For day in, day out *dependability*—you can't beat a



# BJ VERTICAL COOLING TOWER PUMP

FOR REFINERY OPERATION — these pumps have what it takes to handle 'round-the-clock, seven-days-a-week, 52-weeks-per-year pumping! Because they are *BJ engineered*, you can be sure they'll measure up to your cooling tower requirements. Because they are *BJ built*, you can be sure of steady-going, low cost operation that won't let you down.

These are some of the features that make BJ Vertical Cooling Tower Pumps dependable performers: *Rigid alignment*—all parts are machined with shoulders and recesses to form metal to metal joints. *Self-priming*—the self-contained pumping unit takes suction from the pit in which it is mounted. *Simple installation*—vertical suspension saves space and cuts installation cost. *Saves piping*—pump element is suspended on a welded steel discharge column with the motor mounted at the top of the column and direct coupled to the driver shaft. Capacities to 7500 gpm and heads as required. Furnished with motor or to fit motor you have.

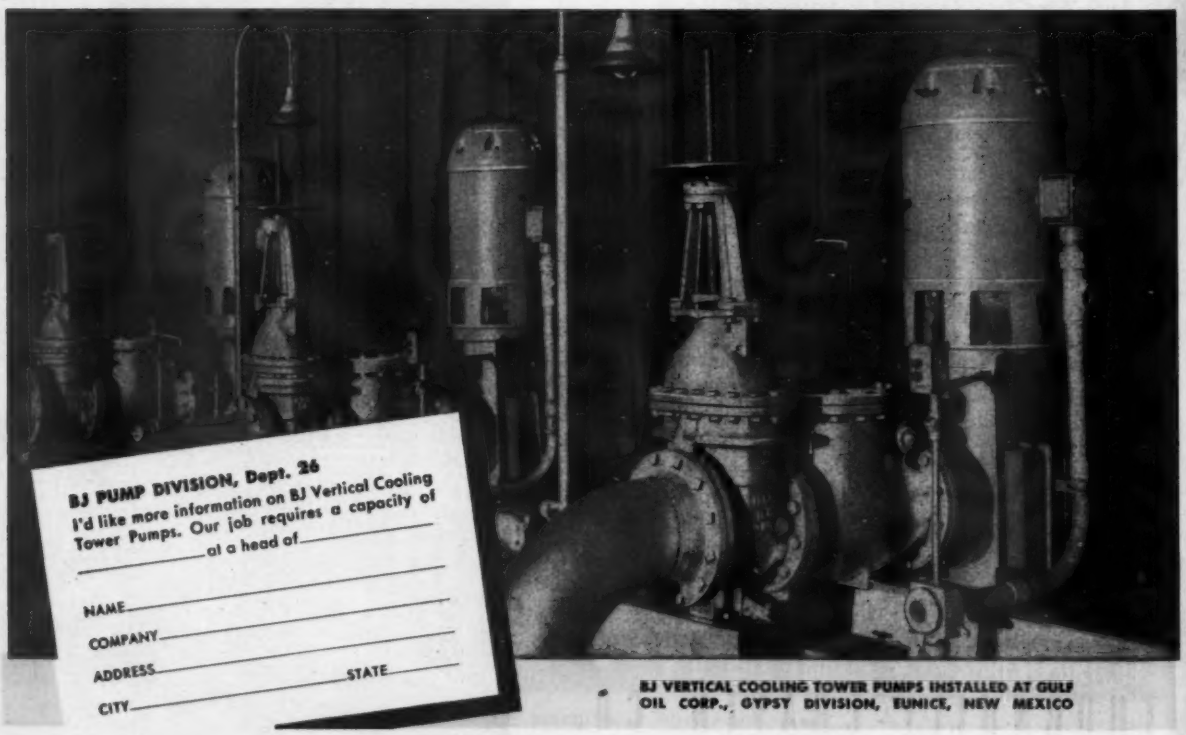
Ask your local BJ representative or send the coupon below for details.

**Byron Jackson Co.**

*Since 1872*

**P. O. Box 2017 Terminal Annex, Los Angeles 54, Calif.**

OFFICES IN PRINCIPAL CITIES



**BJ PUMP DIVISION, Dept. 26**
I'd like more information on BJ Vertical Cooling Tower Pumps. Our job requires a capacity of _____ at a head of _____

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

BJ VERTICAL COOLING TOWER PUMPS INSTALLED AT GULF OIL CORP., GYPSY DIVISION, EUNICE, NEW MEXICO



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- Provides a speedy, powerful, compact, highly mobile carrier for hauling servicing equipment. Also hauls trailers.
- Goes anywhere, in any weather—thru sand, mud, soft dirt, snow, steep grades. Gets to locations formerly impossible with wheeled vehicles.
- Maneuvers sharply in tight spots.
- Travels 30 to 40 m.p.h. on normal roadways.
- Exerts 12,000 lbs. tractive effort at 3 m.p.h.
- Total gross weight of 16,000 lbs.

- Walter Four Point Positive Drive provides 100% traction in four driving wheels. Eliminates spinning wheels and stalled equipment.
- Single, low pressure 14.00 x 20 tires increase rolling ability.
- 125 h.p., 6 cylinder, 404 cu. in. piston displacement motor for heavy loads and pulls.
- 90 inch wheelbase for compactness.
- 16 inch ground clearance for uneven terrain.
- Rugged tractor type transmission, 6 speeds forward, 2 reverse.

**NOTE:** In addition to the Model FZMA described herewith, larger, more powerful units are available, up to 36,000 lb. total gross weight. See your nearest distributor—or write us for full details.

**WALTER MOTOR TRUCK CO., 1001-19 Irving Avenue, Ridgewood 27, Queens, Long Island, N. Y.**

**WALTER**
4-POINT POSITIVE DRIVE
**TRACTOR TRUCKS**

**See your nearest distributor**

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J. F. Brittain
2001 Glenwood Park Ave., Erie, Pa.
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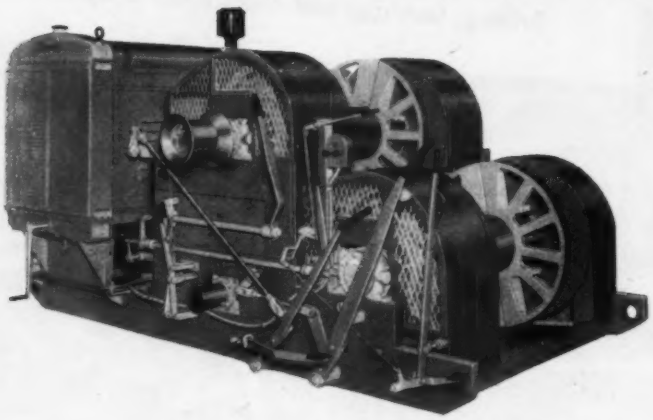
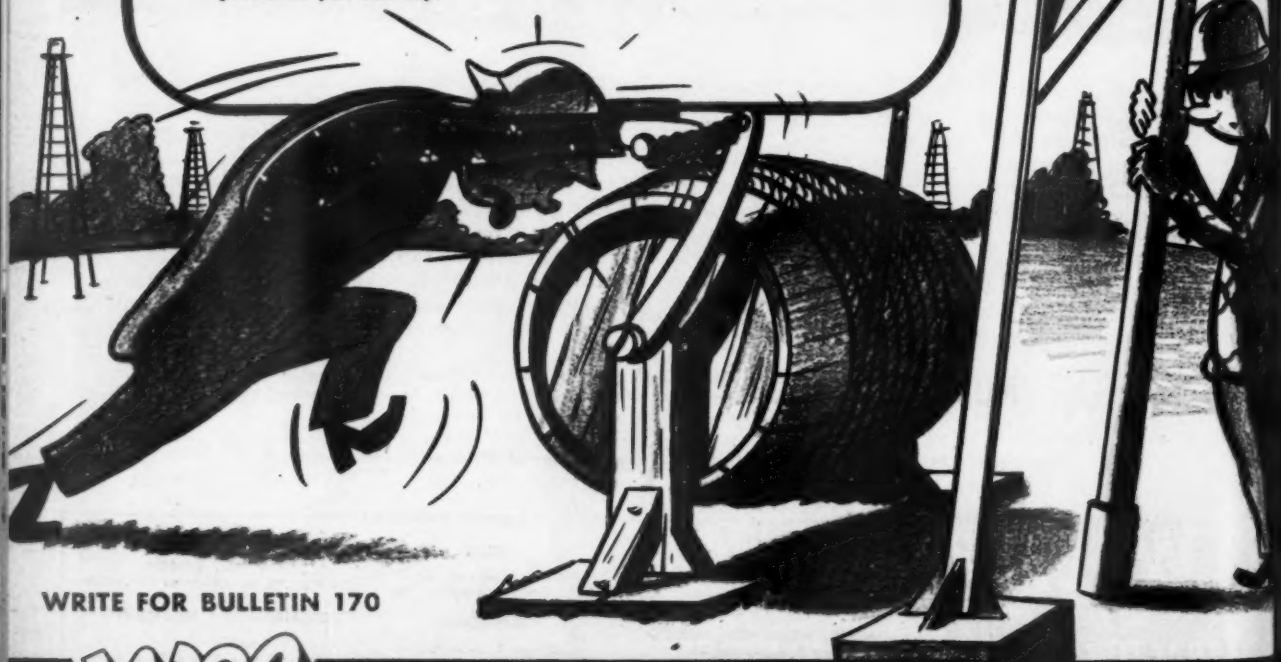
# "Wish we had a Wilson Winch!"

## Wilson Super Double Drum Winch

***Recommended for Depths of 6,000 Feet with 2½" Tubing***



**Yes, Sir, right now when well work-overs are important it is essential to have the most efficient winch — one which will do the job faster, without downtime, and make you money! The Wilson SUPER DOUBLE DRUM WINCH is extremely popular where re-spooling counts. Powerful, self-energizing brakes give instant response when needed. Jaw clutches, friction clutches, or the Wilson Air-Tube Disc Clutch, the best anywhere, are optional. Before buying a winch it will pay you to consult your nearest Wilson Representative and let him explain why Wilson Winches are the most profitable you can buy.**



**WRITE FOR BULLETIN 170**

**Wilson MANUFACTURING CO., Inc.**

WICHITA FALLS, TEXAS

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# This Firefighter can be two places at once!

You can protect several danger spots at one time with a Kidde built-in carbon dioxide fire extinguishing system. ¶ Widely separated fire hazards... even on different floors can be protected by a single Kidde system. If fire strikes a protected space, directional valves rush fire-smothering carbon dioxide gas to the stricken area. The same $CO_2$ can set off mechanisms to shut doors and windows... turn off fans and machinery. After doing its job, the clean, dry $CO_2$ evaporates completely. ¶ Whatever your fire detection and protection problem may be, a Kidde expert will be glad to help. When you think of $CO_2$ call Kidde.

**Walter Kidde & Company, Inc., 234 Main St., Belleville 9, N. J.**
**In Canada: Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.**

**Kidde**



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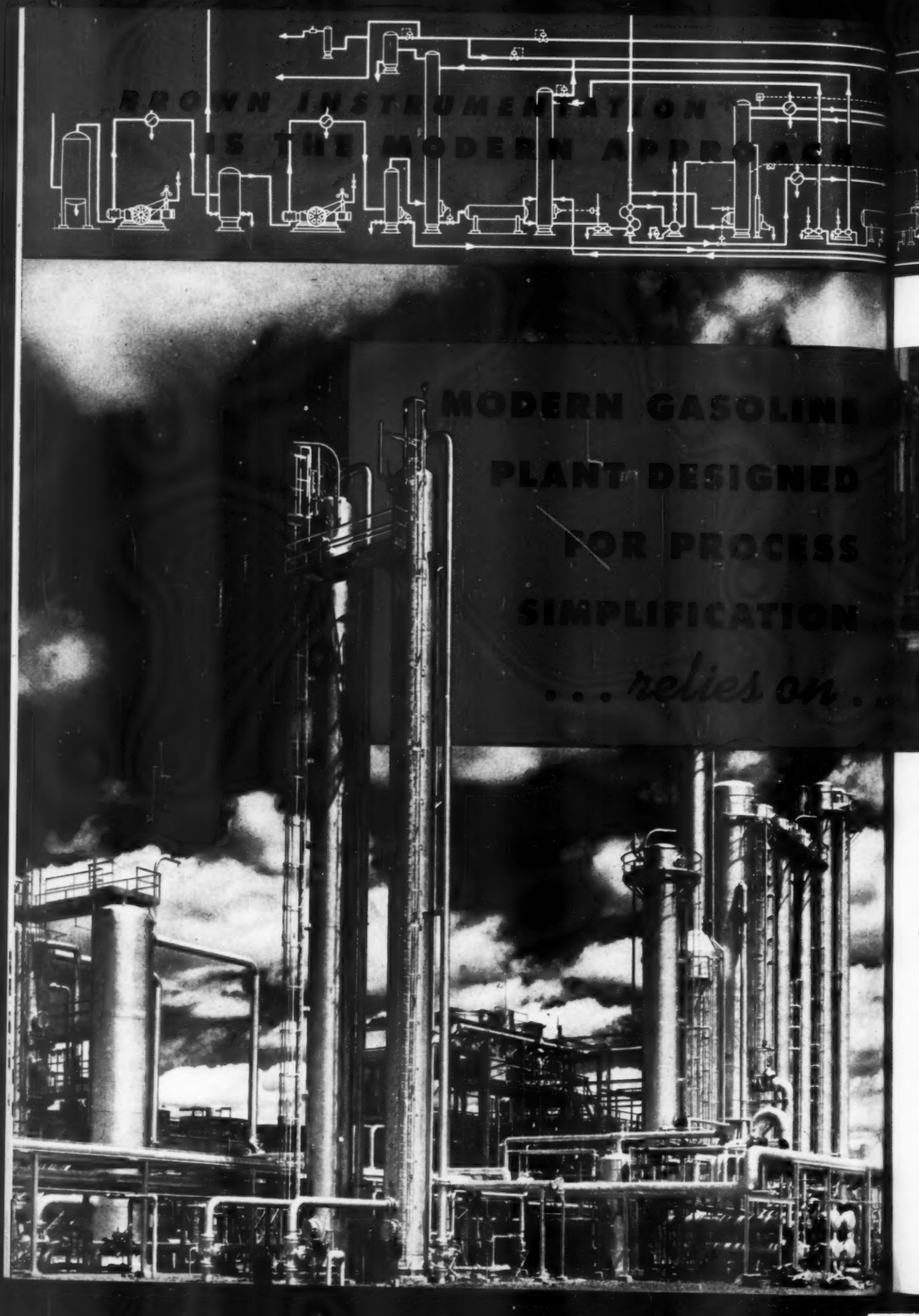
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IS THE MODERN APPROACH
MODERN GASOLINE
PLANT DESIGNED
FOR PROCESS
SIMPLIFICATION
. . . relies on . . .

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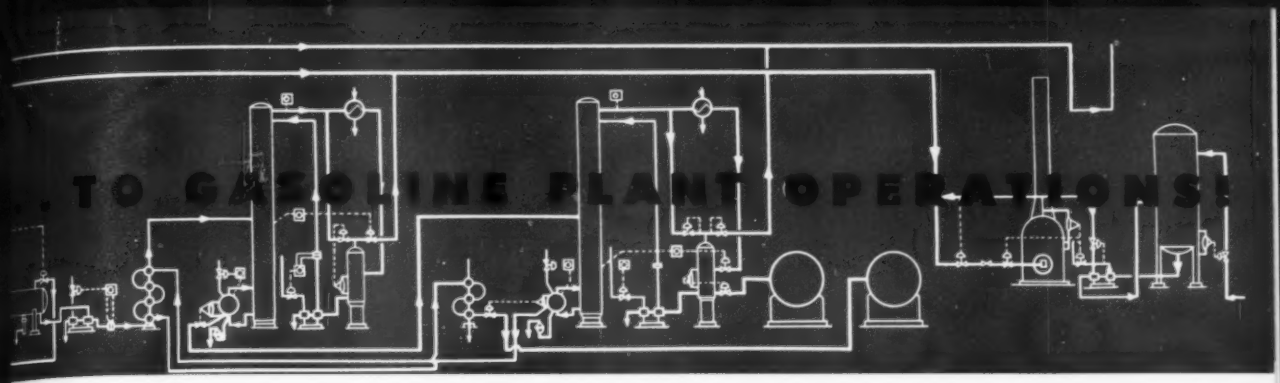

***BROWN INSTRUMENTATION**

. . . is patterned to the exact requirements of individual plants and processes.

. . . is the result of engineering and application know-how, with one responsibility from sensing elements to control valves.

. . . is backed by a nation-wide field engineering and service organization.

**BROWN INSTRUMENTS AND CONTROLS**

THE Panoma Corporation's new natural gasoline plant near Hooker, Oklahoma, is being acclaimed as one of the most modern plants of its type.

All operations are fully automatic in this unique plant, which was engineered by Panoma's I. Earl Nutter and C. D. Van Vliet, with the assistance of Doctors R. L. Huntington and Frank C. Fowler of Oklahoma University. J. F. Pritchard & Company prepared the construction drawings and constructed the plant.

Equipment in the plant was carefully selected to provide the optimum in efficiency. Brown instrumentation, from centrally located panelboards, synchronizes all operations into one smoothly functioning system.

When looking for recording and controlling instruments for your gasoline plant, or *any refining operation—consider first:*

- **The Brown know-how developed through many years of application experience in the industry.*
- **The completeness of the Brown modern approach —recorders, controllers, panelboards, valves, and all accessories.*

Call in our local engineer for a detailed discussion of your process requirements . . . he is as near as your phone. Offices are in more than 80 principal cities of the United States, Canada and throughout the world. MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4488 Wayne Ave., Phila. 44, Pa.

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

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up goes another Harvey Fractionating Column !

**Harvey**

This Column, fabricated by Harveys, was lowered into the Thames near their London works, towed across the North Sea, lifted from the water at Pernis, near Rotterdam, and soon became an active part of the Royal Dutch Shell Group's New Oil Refinery. Harveys undertake all forms of heavy constructional work for the Oil and many other Industries.

Send for Catalogue OG 750

G. A. Harvey & Co. (London) Ltd. Woolwich Road, London, S.E.7

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# PARKERSBURG HYRECO

**UNMATCHED** for boosting condensate recovery

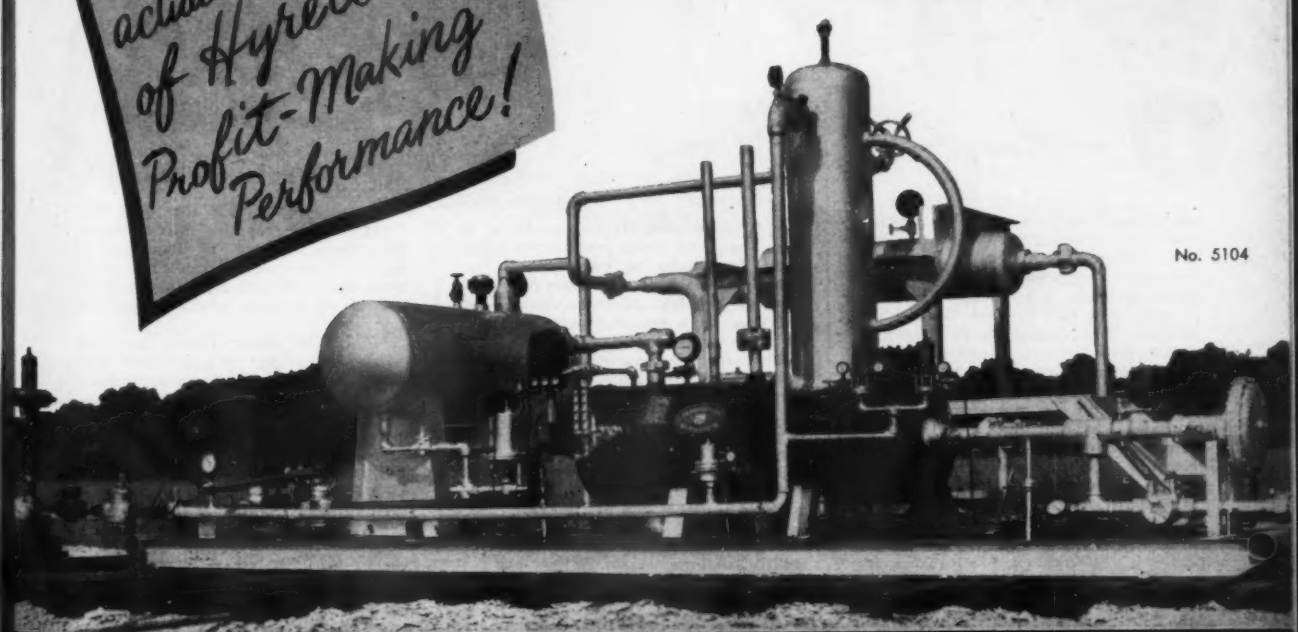
**UNMATCHED** for increasing revenue

*Ask your Parkersburg representative to show you the actual case histories of Hyreco Profit-Making Performance!*

**Each Hyreco installation adds to the record of successful performances which this high pressure gas condensate processing unit is establishing. In every case the operator has been able to recover more condensate . . . substantially increase revenue from his gas wells . . . lower operating cost by prevention of line freezing trouble and expense.**

**No similar equipment available today can process high pressure gas at such low temperatures . . . recover such a high percentage of condensate and pay for itself in such a short time. You owe it to yourself to get all the facts about the revenue-increasing possibilities with Parkersburg Hyreco.**

**PARKERSBURG RIG & REEL CO.**
**PARKERSBURG, WEST VA.**



No. 5104

## PARKERSBURG
## PRESSURE EQUIPMENT

HORIZONTAL AND VERTICAL SEPARATORS • HYRECO • HYDRACEPTER • SCRUBBERS • TREATERS • HEATERS

Manufactured in Houston, Texas

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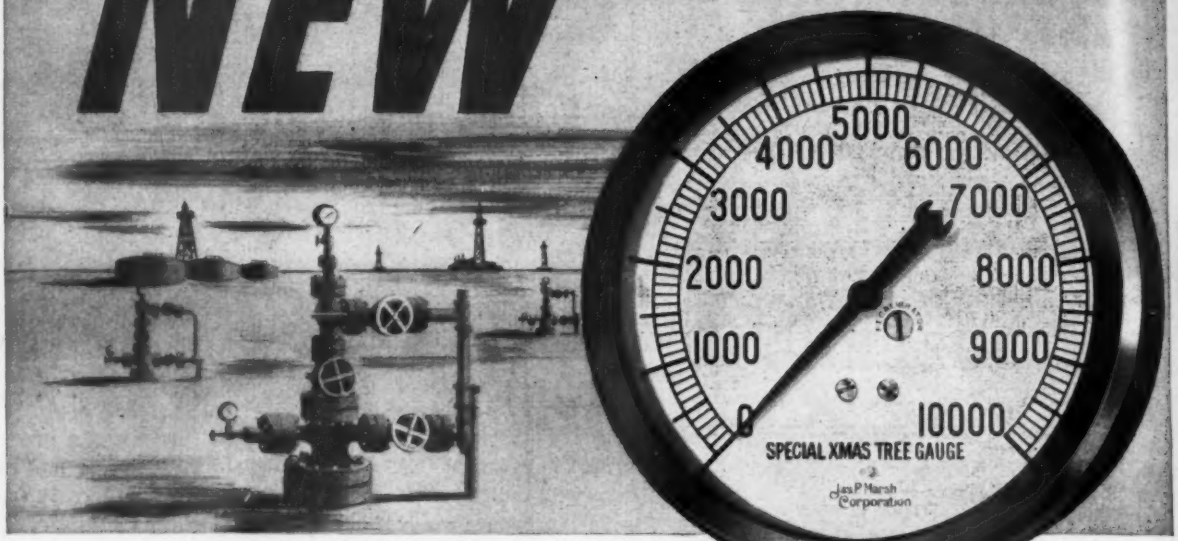
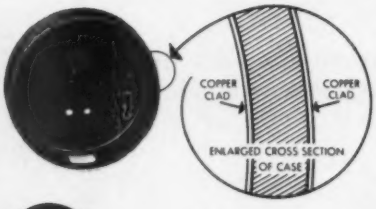
# A NEW Xmas Tree Gauge

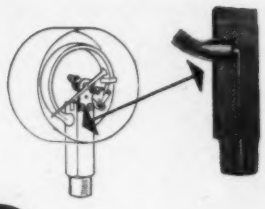



**TAKE A GOOD LOOK** at the facts presented below and we believe you'll agree that this is the finest Xmas Tree Gauge ever developed!




## 1 NEW *Marshalloy* CASE

A brand new conception in gauge housings. It is corrosion resistant, four times as strong and one-third lighter than conventional iron cases. It is made of copper-clad wrought steel of boiler plate thickness. It is much less likely to corrode than iron or steel, but has the strength of heavy-gauge steel. Known as "Marshalloy," it has all the advantages of plastic or die-cast cases, but none of the disadvantages. It can't be broken like a plastic or die-cast case. It won't rust or corrode. It has four times the strength of cast iron, but only two-thirds the weight. Finished in a new corrosion resistant, satin black enamel, and fitted with Marsh safety blow-out plug, it is the finest case you have ever seen.



## 2 NEW *Conoweld* TUBE

**Tube, socket and end-piece "Conowelded" into an integral unit**

To insure absolute dependability, a gauge must be made permanently leak-tight from inlet to end-piece of the bourdon tube. This has always presented a tough problem, but here is the final solution. By a special process the tube is "Conowelded" into socket and end-piece to form the equivalent of one-piece construction. The tube is then accurately tempered to required resiliency.

The unretouched photo of a socket sawed in half shows the perfect fusion of the joint at the point where the bourdon tube enters the socket—the joint that is most difficult to make. Photomicrographs are also available to prove the perfection of this process.

## 3 SUPERLATIVE *Mastergauge* MOVEMENT with coined sector

The crowning touch to the Xmas Tree Gauge is the Marsh "Mastergauge" Movement. In tens of thousands of Marsh "Mastergauges" this finer movement has proven its ability to stand the gaff of oil country service better than any other.

Notice the broad pinion gear and coined sector gear surfaces with teeth cut to the highest standards of precision. The coined form (see enlarged section) is a typical Marsh refinement — a form that gives greater strength where greatest strength is needed. Unlike metals, giving a self-lubricating frictionless effect, are used throughout. It is a movement in keeping with the advanced design and construction of this new Gauge.

**MARSH INSTRUMENT CO.** Sales affiliate of Jas. P. Marsh Corp. **Dept. L, Skokie, Ill.**

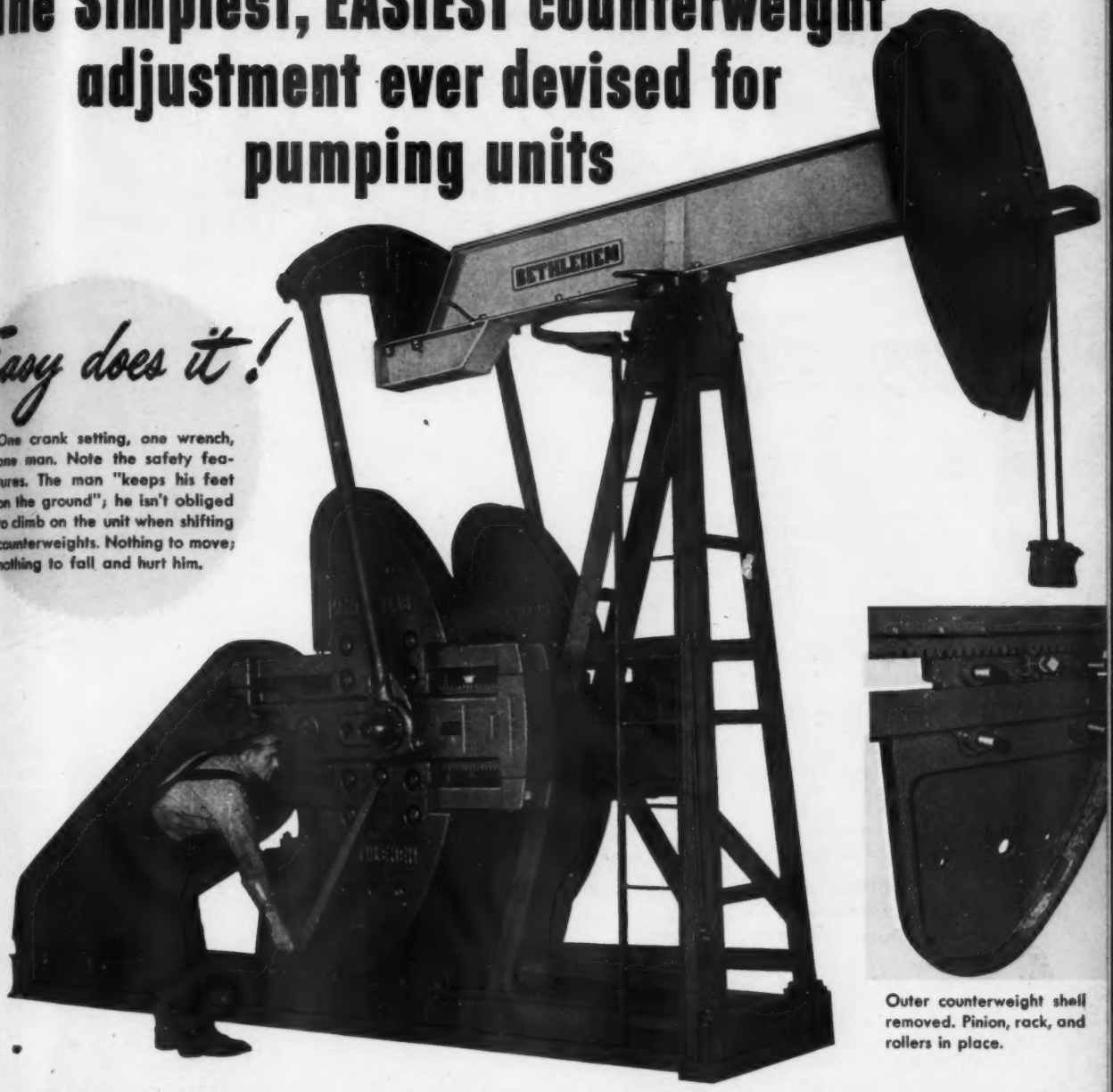
*Houston Branch Plant* **1121 Rothwell St., Houston, Texas**

# MARSH GAUGES

# The Simplest, EASIEST counterweight adjustment ever devised for pumping units

*Easy does it!*

One crank setting, one wrench, one man. Note the safety features. The man "keeps his feet on the ground"; he isn't obliged to climb on the unit when shifting counterweights. Nothing to move; nothing to fall and hurt him.






Outer counterweight shell removed. Pinion, rack, and rollers in place.

Bethlehem's Series 50 Pumping Units feature great new improvements in mechanical counterweight adjustment—improvements that top anything of the kind yet offered in the long history of oil-field pumping. They were developed slowly, carefully; they were subjected for many months to the most rigorous field tests, the most brutal we could devise—and they passed every test without a whimper.

We wanted efficient mechanical counterweighting that could be varied *easily* at the will of the operator. We got it. Note the large photograph. After loosening four nuts, the field-man can shift the position of a counterweight in a matter of seconds. An easy tug on the wrench will do it—a child can do it! Numbered graduations on the crank, and an index on each outer counterweight shell, facilitate adjustment.

The great ease with which counterweights can be shifted is explained by the smaller photograph. A pinion, turned by the socket wrench, is geared to the crank rack. Smooth, sturdy rollers help to ease the counterweight along the corresponding crank rail.

For many applications, the heavy cast shells alone provide sufficient counterweighting. However, if more is required, counterweight inserts, furnished by Bethlehem, can easily be bolted inside the shells.

The new Series 50 units are already operating successfully at many points in the field. If you'd care to see some of them at work, a Bethlehem man will be glad to arrange it. We want you to study them—and hear their owners' comments!

BETHLEHEM STEEL

**BETHLEHEM SUPPLY COMPANY**

GENERAL OFFICES: 21 E. SECOND STREET, TULSA, OKLA.

**Subsidiary of Bethlehem Steel Corporation**

On the Pacific Coast Bethlehem Oil-Field Equipment is sold by Bethlehem Supply Company of California.
*Export Distributor:* Bethlehem Steel Export Corporation

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# Bingham

## PRECISION BUILT FIELD PROVEN PUMPS

### "Double Volute"
**DOUBLE CASE, HIGH PRESSURE**
### Refinery Pumps

Bingham Double Case Refinery Pumps are of "Double-Volute" design, insuring perfect radial balance of the rotating element—eliminating seizure and wear between rotating and stationary parts and reducing stuffing-box maintenance to a minimum.

A salient feature in Bingham "Double-Volute" pumps is the "TWO NOZZLE" discharge from the inner case into the outer case—the nozzles being located 180° apart. For hot service, this feature provides adequate circulation of pumpage, insuring a uniform temperature rise of all parts, particularly the outer case. *Distortion due to temperature changes is eliminated.*

Bingham "Double Volute" Multi-stage Double Case Pump handling corrosive gas oil at the Puerto la Cruz Refinery of the Venezuela Gulf Refining Company.

• • •

**It takes Big Precision Tools like these to Build Pumps like this**

Bingham Double Case Pumps, like all Bingham products, are precision built. All rotating parts requiring close tolerances are ground on heavy duty precision grinders. Inner volute flanges are finished ground to a perfect degree of flatness by heavy duty grinders which are typical of the precision machinery in our new and modern plant.

Heavy Duty Face Grinder in our new and modern plant.

**SEND NOW** FOR "DOUBLE VOLUTE" treatise describing the principle and advantages of Bingham "Double Volute" pumps.

Bingham PUMPS — DOUBLE VOLUTE RADIAL BALANCE — SINCE 1921

GENERAL OFFICES:
705 S.E. Main Street
Portland, Oregon

FACTORIES:
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Vancouver, Canada

Sales and Service Offices: BOSTON, MASS., 113 Broad Street • CHICAGO, ILL., 275 Old Colony Bldg., 407 South Dearborn Street • HOUSTON, TEX., 1206 Union National Bank Bldg. • MIDDLETON, OHIO, 505 Federal Savings & Loan Bldg. • NEW YORK CITY, N. Y., 611 Graybar Bldg., 420 Lexington Ave. • PITTSBURGH, PENN., 102 Mt. Lebanon Blvd. • SAN FRANCISCO, CALIF., 420 Market St. • SEATTLE, WASH., 316 Joseph Vance Bldg., 1402 Third Ave. • ST. LOUIS, MO., 2533 Salem • ST. PAUL, MINN., 205 South Robert St. • TULSA, OKLA., 200-206 N. Denver St. • VANCOUVER, CANADA, 3550 E. Broadway.



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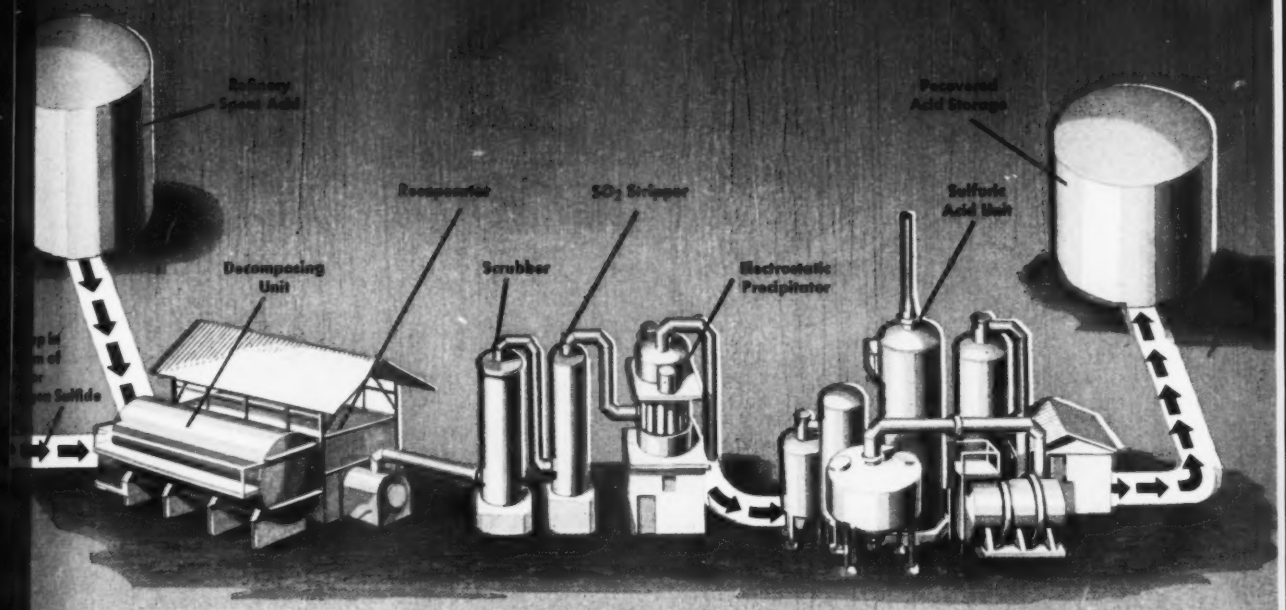
## CHEMICO OFFERS AN ECONOMICAL PROCESS FOR

# *Spent Alkylation Acid Regeneration*




Due to the increased cost of brimstone and the vital need to conserve basic sulfur deposits, petroleum refiners producing high octane aviation gasoline will find it desirable to recover the sulfuric acid from their spent alkylation acid. For this purpose, Chemico offers a proven and economical process.

In this process, spent alkylation acid—now in greater supply as a result of the increased manufacture of high octane gasoline—is sprayed into a furnace maintained at a high heat with auxiliary burners. Sulfur or hydrogen sulfide may be used as fuel thereby producing $SO_2$ gas for the production of make-up acid.

A limited amount of other liquid acid sludges, high in hydrocarbon content, may also be added to the alkylation spent acid, thus providing fuel as well as additional acid production. The hydrocarbons are completely consumed and the acid is broken down into its components—sulfur dioxide, oxygen and water. After the water is removed, the gas is processed to fresh acid of 98% strength in a Chemico contact sulfuric acid unit. Send for additional information, stating your requirements.

## CHEMICAL CONSTRUCTION CORPORATION

A UNIT OF AMERICAN CYANAMID COMPANY

488 MADISON AVENUE, NEW YORK 22, N. Y.

EUROPEAN TECHNICAL REPRESENTATIVE: CYANAMID PRODUCTS, LTD., LONDON W. C. 2, ENGLAND
CABLES: CHEMICONST, NEW YORK

*Chemico plants are profitable investments*

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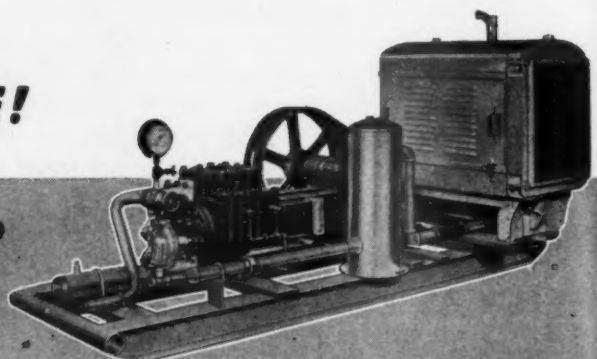
# Service... follow-through

It's a smart buyer who looks beyond the purchase of a pump—investigates carefully the long-range service policy of the manufacturer. Gaso welcomes such an investigation. We maintain stocks of parts for all standard Gaso models ever made—with a rule of shipping by fastest route on the day the order is received.

SAY GASO AND BE SURE!



## GASO PUMPS

*for every oil industry need*

**GASO PUMP & BURNER MFG. CO.** 902 EAST FIRST ST., TULSA, OKLA.

EXPORT OFFICE: 149 BROADWAY, NEW YORK

Shreveport: W. L. SOMNER CO., 419 Lake Street • Los Angeles: 2529 Chambers St., Vernon • Western Canada: Lufkin Machine Co., Ltd., Edmonton, Alberta

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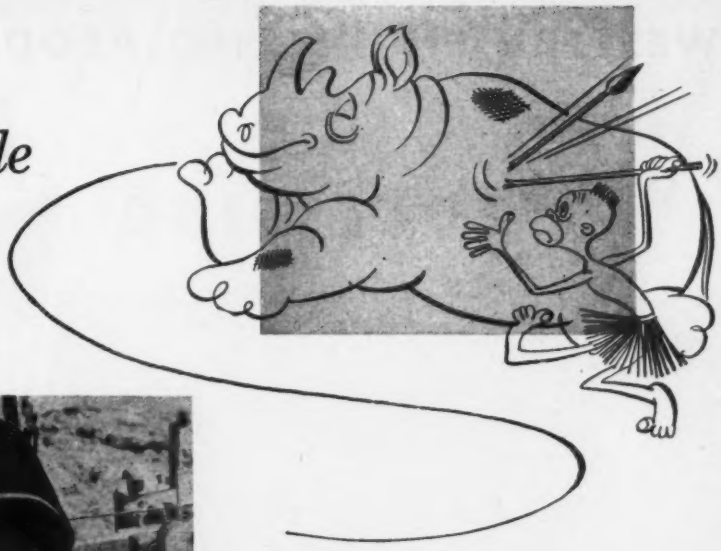
*Like the Rhino's tough hide that protects what's inside...*



## Johns-Manville Asbestos Felt protects oil and gas pipe lines

MORE than 100,000 miles of oil and gas pipe lines are now protected by Johns-Manville Asbestos Pipeline Felt—*the only type of wrapper that has survived over 50 years of service in all types of soils.*

Johns-Manville Asbestos Felt is a sturdy, inorganic product. It has the thickness and toughness necessary for shielding pipeline enamels from earth load and soil stresses. It is resistant to rot and decay, and to acid and alkali soils. It permits the protective enamel coating to properly function against corrosion.

Johns-Manville Asbestos Felt is flexible. It wraps easily without cracking. It guards enamel from impact during installation of field-wrapped pipe, or during transportation and installation of mill-wrapped pipe..

There are economic advantages, too. In addition to reducing maintenance expense, Johns-Manville Asbestos Felt adds many years of life to the pipeline. For further information and a sample of Johns-Manville Asbestos Pipeline Felt, mail the coupon below.

JM PRODUCT

**Johns-Manville**
*Asbestos*
**PIPELINE FELT**

Johns-Manville
Box 290, New York 16, N. Y.
Please send me a copy of the sample folder on Johns-Manville Asbestos Pipeline Felt, PP-22A.

Name_____

Address_____

City_____ Zone____ State_____



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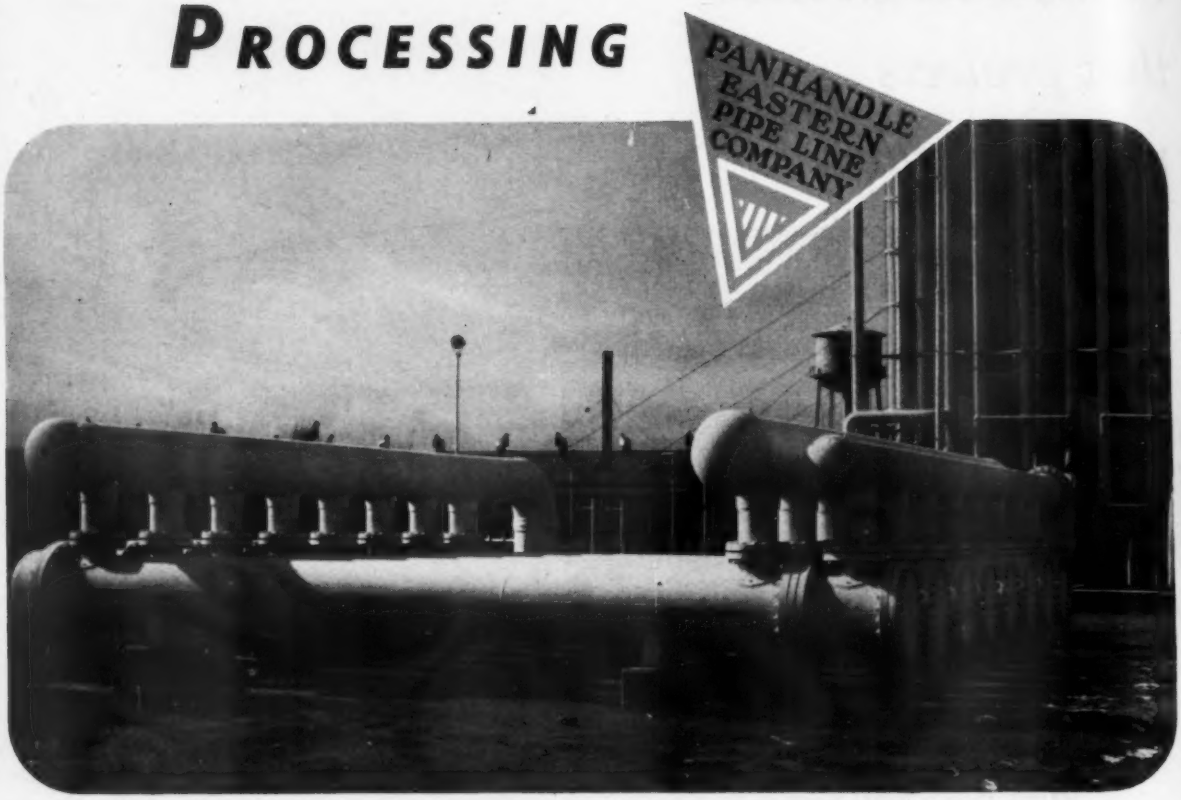
# WESTERN-ENGINEERED PRODUCTS...

# FOR GAS PROCESSING




The above pictured installation is a battery of high pressure Gas to Gas Coolers installed at Panhandle Eastern's Dehydration plant in Liberal, Kansas. Set into operation in 1944, there have been two additions since that time.

The Panhandle Eastern job is an isolated instance of the many services being handled by Western heat transfer equipment on Gas Transmission Input Stations and Main Line Compressor Stations. Lube Oil Cooling with Compressor Suction Gas; Engine Jacket Water Cooling—both aerial and Atmospheric (Coil in Tower Basin); Conventional Lube Oil Cooling with water, and Gas After Cooling are a few of the other services being performed by Western equipment in Gas Processing, Gas Transmission and Distribution Systems throughout the United States.

All Western heat exchange equipment—atmospheric sections, shell and tube exchangers and reboilers—are characterized by a close attention to engineering specification and detail.

Western's technical staff will work closely with you on any heat transfer problems vital to the economical and efficient operation of your plant. Precision tooling in the Western fabrication shops, plus skilled and experienced mechanics are coordinated to produce trouble-free heat exchange equipment and minimize "down-time" through mechanical failure. Check your heat exchange operational and maintenance records now, and if replacements are coming up, consult with Western—daily their equipment is competently serving the petroleum, chemical and refinery industries.

TEMA TUBULAR EXCHANGER MANUFACTURERS ASSOCIATION

## WESTERN HEAT EXCHANGERS

*Manufactured by*

**WESTERN SUPPLY COMPANY**

P.O. BOX 1888 TULSA, OKLAHOMA

*SALES OFFICES — DALLAS — HOUSTON*

SEE OUR CATALOG IN SWEET'S

PROVIDED FOR YOUR CONVENIENCE

SEE OUR CATALOG IN REFINERY CATALOG

Sales Representatives:

TRIDENT ENGINEERING CO.—16 Beale St.—San Francisco

JACKSON ENGINEERING CO.—6144 Ferguson Dr.—Los Angeles

XUM

# RADIOGRAPHY

## *reveals sound*

## LUNKENHEIMER STEEL CASTINGS

Radiographic waves search the internal structure of Lunkenheimer steel gate valves, exposing the dense, sound quality of their castings. The smooth tone of this short-wave gamma ray photo is your final assurance of soundness in the steel valve you depend on for round-the-clock petroleum service. Other tests guard the Fig. 1751 from imperfections after every manufacturing process — from foundry to final assembly. It's especially engineered and tested for 150 lb. pressures in the oil industry.

For service on your oil or oil vapor lines, specify body-bonnet-trim combination WB2. Body and bonnet are of cast carbon steel, and special oil-trim is of 13% chrome stainless. The same valve is also available for steam and other non-lubricating fluids . . . specify Fig. 1751 WB6.

The disc rises clear of the straight-through, streamlined port-to-port flow to minimize turbulence and pressure drop. Backseating faces let you repack the valve while it's wide open and under pressure.

*Write for your free copy of "Lunkenheimer Oil Industry Valves," a circular in color describing more than fifty bronze, iron, and steel valves, "service engineered" for the petroleum industry.* Address: The Lunkenheimer Co., Box 360F, Cincinnati 14, Ohio.

Figure 1751
Steel Gate

STEEL • IRON • BRONZE

# LUNKENHEIMER

THE ONE *Great* NAME IN VALVES

L-151-37



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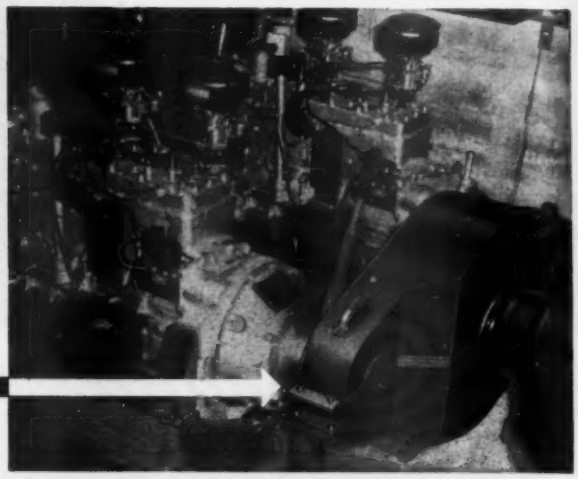
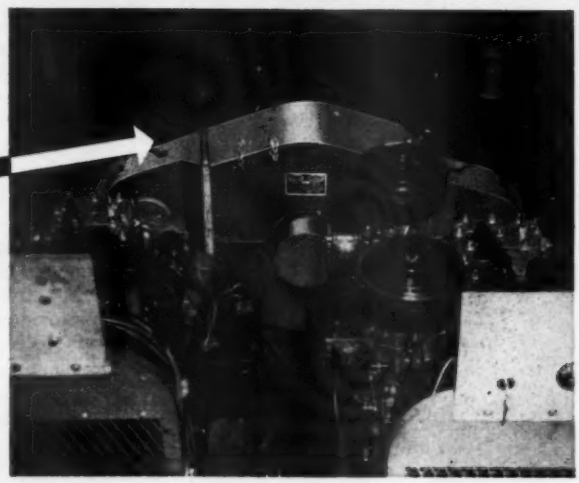
# Whether it's radio broadcasting or

# Compounding engines with

World War I aircraft engine previously used at radio station WHAS outlived its usefulness, required excessive maintenance, was discarded.



Two new gasoline engines economically compounded by compact Morse Silent Chain Drives (in steel case). Precision-built in pitches from 3/16" to 2", Morse Silent Chain is immediately available in a wide range of widths.

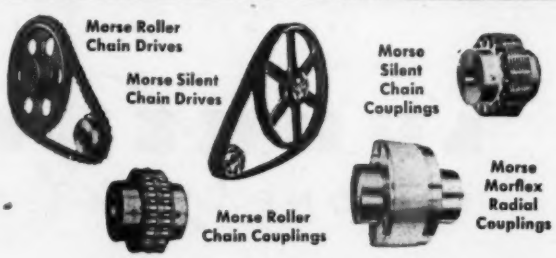


View looking over twin six-cylinder engines shows Morse Silent Chain Drive case in front of generator that supplies WHAS's power requirements in emergencies. This type of compounding installation is successfully used in many oil field installations.

**Ask the Morse Man for power transmission information!**

**100 Morse Branch Offices and Distributors to supply your power transmission demands.**

From coast to coast there are more than 100 offices, representatives and distributors of Morse Power Transmission products to give you quick information and service when you want it—where you want it. *Ask the Morse Man first in any case!* Check your classified phone directory under **"Power Transmission"** or **"Chains"** for the nearest Morse Man.


Morse Roller Chain Drives
Morse Silent Chain Drives
Morse Silent Chain Couplings
Morse Roller Chain Couplings
Morse Morflex Radial Couplings

## oil well drilling....

# MORSE SILENT CHAIN DRIVES

## *saves money, saves space*

Ample power, greater portability, reliability—at lower cost. That's what users in virtually any field achieve when they compound engines with compact Morse Silent Chain Drives.

A compounding installation in Louisville's 50,000 watt radio station WHAS is typical. (Oil field operators can meet their problems with similar installations.)

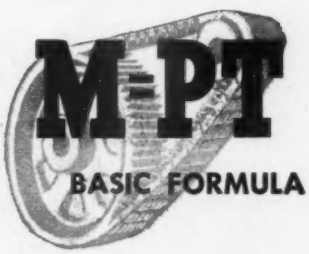
Driving a standby electrical generator at 750 r.p.m., two six-cylinder gasoline engines developing 153 h.p. (maximum) each are compounded by Morse Silent Chain Drives. The two engines, including their Morse Silent Chain Drives, cost less than a single engine of equal total horsepower.

**Why Morse Silent Chain is better**

Because of its exclusive, frictionless Rocker-Joint, Morse's precision-built Silent Chain is made-to-order for high speeds and heavy loads. The Rocker-Joint converts sliding action to rocking motion, reduces joint wear and pitch lengthening.

Morse Silent Chains are 99% efficient, give long, trouble-free service life. They are positive, can't slip. They use teeth, not tension; operate smoothly, quietly.

For more complete information about the advantages of compounding with Morse Silent Chain Drives, write: Morse Chain Company, Dept. 120, 7601 Central Ave., Detroit 8, Mich.




**Morse *means* Power Transmission**

Morse Morflex Couplings

Morse-Rockford Clutches

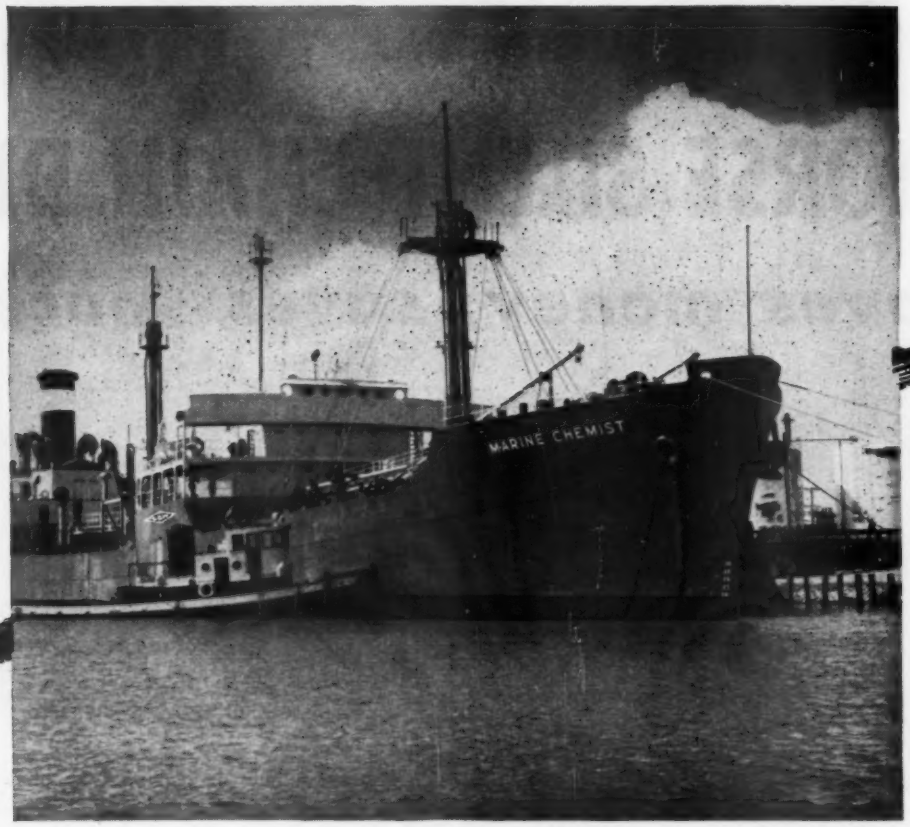
Morse Morflex Drive Shafts

Morse-Rockford Pullmore Clutches

**MORSE**

MECHANICAL *POWER TRANSMISSION* PRODUCTS

PRODUCTS OF BW BORG-WARNER




## To Serve Industry Better—

Dow's superior service assures you of *dependable* caustic soda delivery, so necessary to steady production.

Dow produces caustic soda in three plants—in Michigan, Texas and California. Dow maintains caustic soda solution bulk tank distributing terminals in Carteret, New Jersey and Charleston, So. Carolina. In addition, Dow ships caustic soda Solid, Flake, and Ground Flake from terminals in Chicago, Illinois, Port Newark, New Jersey, and Charleston.

By tank and box car, truck and ship, Dow caustic soda reaches your plant on schedule.

**THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN**

New York • Boston • Philadelphia • Washington • Atlanta • Cleveland • Detroit • Chicago • St. Louis • Houston
San Francisco • Los Angeles • Seattle

Dow Chemical of Canada, Limited, Toronto 1, Canada

*wherever you are... you're close to*

**DOW CAUSTIC SODA**

DOW

CHEMICALS

INDISPENSABLE TO INDUSTRY AND AGRICULTURE

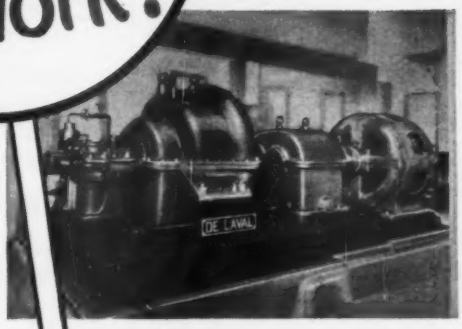
XUM

# De Laval Blowers at work!

## Birds-eye View of 343,000 C.F.M.

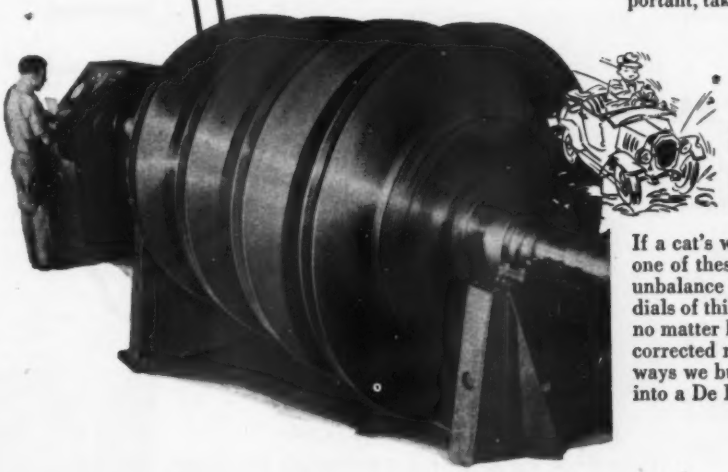
That's the combined capacity of these three big De Laval blast furnace blowers installed at the Edgar Thomson Works of Carnegie-Illinois Steel Corporation. Every day they handle enough air to fill a four foot square tunnel from Manila to Madrid and back to Miami. What's more, blast furnaces aren't shut down till they need relining and it takes husky, heavy duty machines like these to stand up for long periods of continuous operation.

*For your next blower, be sure to get more than just a birdseye view of a De Laval unit. Let our engineers show you the whole picture.*




## They forgot the rule book for this blower!

We would never recommend that a centrifugal blower be opened for inspection only once every 22 years. Yet this De Laval two-stage machine in the Houston, Texas Sewage Disposal Plant was recently opened for the first time since it was installed in 1928 . . . *the blower and gear were in near perfect condition!* Our service man only had to clean up the journals a bit and put the unit back in service. If heavy-duty, continuous service is important, take your cue from this. We build 'em to last.



## Stopping vibration before it starts!

If a cat's whisker could hang onto the edge of one of these spinning blower wheels, the unbalance it created would show up on the dials of this dynamic balancer. Any unbalance, no matter how slight, can be detected and corrected right here. This is just one of the ways we build extra years of service into a De Laval blower.

**DE LAVAL STEAM TURBINE CO., TRENTON 2, N. J.**

TURBINES • HELICAL GEARS • CENTRIFUGAL BLOWERS AND COMPRESSORS
CENTRIFUGAL PUMPS • WORM GEAR SPEED REDUCERS • IMO OIL PUMPS

50th DE LAVAL Anniversary

C-17



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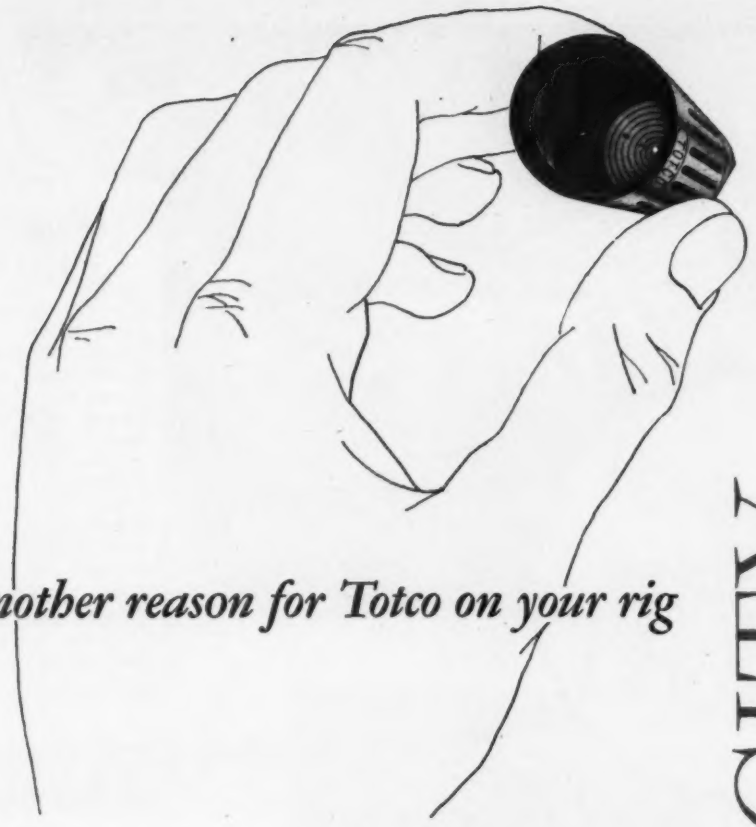


# SIMPLICITY

## —another reason for Totco on your rig

There's no other drift indicator as simple and as fool proof as your TOTCO Recorder. Infinitely detailed in design ... Sure! But simple to run and simple to read. Anyone can do it and know it's right.

There's no involved procedure—no batteries, chemicals or ink pots—just an accurate, dependable mechanical instrument that's known and preferred in oil fields the world over. If you find your present equipment a bit complicated you'll appreciate TOTCO'S unparallelled simplicity.

*Be* **SURE** *you know, use* **TOTCO**

**YOU CAN TAKE TOTCO READINGS ANYTIME**

Run in and out on measuring line.

Dropped down drill pipe; picked up with core barrel overshot.

Dropped down drill pipe; recovered when bit is changed.

Run in the Recorder connected to a core barrel overshot when picking up a retractable core barrel.

Run in and out on ordinary sand line.

TOTCO *Recorder*

*Technical Oil Tool Corp., Ltd.*

*1057 N. La Brea Ave., Los Angeles 38, Calif.*

**Exclusive Distributors:**

*California*—Republic Supply Company of California
*Domestic*—Continental Supply Company
*Canada*—Oil Well Supply Company
*Export*—Lucey Export Corporation, New York.

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION MEMBER

DU PONT REG. U.S. PAT. OFF.

PETROLEUM CHEMICALS DIVISION

# NEWS

DU PONT REG. U.S. PAT. OFF.

February ★ One of a Series of Interest to the Petroleum Industry ★ 1951

## Rapid-Fire Action Makes Gasoline Survey Timely

In order that Du Pont's first quarterly Motor Gasoline Survey for 1951 might be both accurate and timely, it was necessary to coordinate many people into a fast-moving team geared to put this undertaking in the mails in less than one month after the start of operations.

In two brief weeks 680 samples of gasoline were picked up by service representatives in 46 cities in the United States and Canada, were tested by five field laboratories, and the findings sent to Wilmington. Between January 12 and January 22 the results were compiled, printed, mailed—and refiners were given an accurate national picture of *current conditions* in the gasoline market.

## Du Pont Nylon Plastic Contributes Economy and Improved Performance in Gears, Bearings

### *Automobile Industry Using Nylon in Mechanical Parts*

The engineering departments of the major automotive companies are examining nylon for a variety of uses in this industry – for bearings, gears, lenses, lock nuts, and many other parts.

Molded nylon is used in two places in the Ford – the speedometer take-off gear and the striker wedge in the door-lock assembly. By adopting nylon for the speedometer gear, Ford has achieved a 50 per cent reduction in costs for this part while obtaining superior performance to the unit replaced.

The nylon door-lock wedge provides superior abrasion-resistance to repeated impact, improved over-all efficiency of operation, and a reduction in cost compared with the previous material.

This nylon door-lock wedge resists abrasion and impact and costs less than the part it replaces.

## Nearly 100 Prints of Du Pont Movie *"What Makes a Gasoline Good"* in Circulation

In August 1950, when the film "What Makes a Gasoline Good" was first shown to the petroleum industry, not even the most optimistic guessers foresaw how extensive its distribution would become.

Today, there are nearly 100 prints in circulation, and, once again, nobody will venture to predict the total distribution by the end of 1951.

WHAT IS THE STRAIGHT GOODS ON REGULAR VS. PREMIUM GASOLINE ?
How Joe Smith Made a Steady Customer By Knowing What Makes a Gasoline Good

Front cover and an inside page of the 16-page, four-color booklet which explains how gasoline is made. It is used in conjunction with the Du Pont movie, "What Makes a Gasoline Good."

"What Makes a Gasoline Good" was produced by Du Pont as a marketing aid for gasoline companies. It was intended as an informative and educational film to be shown at dealer meetings for the purpose of telling gasoline service station personnel more about the basic product they sell.

In conjunction with the film, and to make a well-rounded merchandising package, two companion pieces were produced. The first was a 16-page cartoon book in full color called, "How Joe Smith Made a Steady Customer by Knowing What Makes a Gasoline Good." This is distributed at dealer meetings, after the showing of the film. It retells the story of the film in briefer style. It acts as a reminder of the facts shown in the movie, and stands on its own feet in telling the story of gasoline to anyone who may not have seen the film.

The third piece in the "movie package" is a "Gasoline Quiz." Here again, guesses as to its potential popularity were well on the modest side. But it seems that quizzes are enjoyed by people whether they occur on radio, TV or in print, and

OVER

## *Director of Du Pont Petroleum Laboratory*

MILTON H. CAMPBELL joined Du Pont in January 1947. As Director of the Petroleum Laboratory he heads up the research and development work on petroleum chemicals at this laboratory. Previous to coming to Du Pont, he was a research engineer with the Standard Oil Company of Ohio, where he conducted research on engine fuels. He received degrees from the University of Michigan and Case Institute.

*ADVERTISEMENT — Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)*

CONTINUED

## 100 Prints

so, the "Quiz" went over. It asks questions about the points brought up in the movie and cartoon book — and any service station salesman who can answer the questions has a sound working knowledge of the gasoline he sells.

All three units in this package are available through Du Pont Petroleum Chemicals Division District Offices. Films can be either borrowed or bought depending on whether the refiner wants permanent possession, or not. The gasoline books with quiz sheets enclosed are supplied free of charge in small quantities. In larger quantities they are offered at $35.00 per thousand including the refiner's imprint on the back cover, if desired.

Since Du Pont is not prominently mentioned in any of the three pieces, this "package" will fit smoothly into any refiner's merchandising plans. If you have not yet seen the film, be sure to contact your Du Pont Petroleum Chemicals District Office for a showing.

## New Booklet on Tank Cleaning

### *TANK TALK Appeals to the Man Who Does the Cleaning*

Du Pont's new booklet TANK TALK is written for the men who actually enter and do the work of cleaning gasoline storage tanks.

The problem in preparing this booklet, therefore, was to write it in a way that would make it interesting enough

**Cover of the 52-page, pocket-size booklet *Tank Talk* which is written to appeal to and instruct the men who enter and clean gasoline storage tanks.**

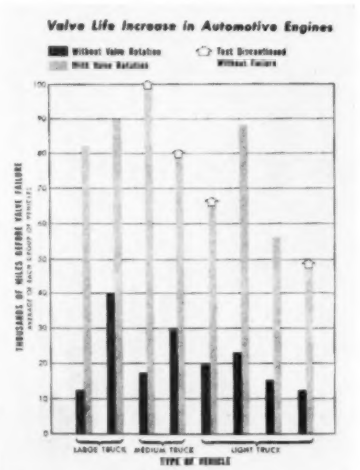
to be not only *read* but *reread* many times by these men.

The result is a booklet based on the successful style set by many Armed Forces manuals in World War II. TANK TALK is pocket size, 8" x 5¼". Its cartoon style treatment tells a picture story which is amplified by personalized copy in balloons. The longer text is usually in the form of jingles which are entertaining to read and easy to remember.

The booklet is not intended as a substitute for the excellent A.P.I. manual, "Cleaning Petroleum Storage Tanks, Section B—Gasoline Tanks." Rather it is to be used as a supplement to this manual. The former gives information of value to supervisors, foremen and others who are responsible for the safety of men and equipment when gasoline storage tanks are cleaned. TANK TALK gives that part of the necessary information which the men who do the actual work should know. Du Pont's experience to date shows that they will read it.

## Valve Life Greatly Increased by Rotation Devices

Increase in exhaust valve life from two to five times is being obtained in commercial vehicles through the use of mechanical devices which permit the valve to turn when open.




These devices have been extensively service-tested in both the laboratory and on the road, in large and small truck engines as well as stationary engines and under heavy, medium and light duty conditions. All tests have shown improvement in valve life to be phenomenal. Many tests in Du Pont's Petroleum Laboratory have verified these findings.

What is probably more important is the success these devices have enjoyed in actual commercial fleet operation where results have been outstanding.

Today, most manufacturers make valve rotating mechanisms available on original equipment. They are also available as replacements for nearly every make and model of commercial engine in operation.

The chart shows typical data on valve life increase. It is reproduced from an "Exhaust Valve Rotation" booklet prepared by Du Pont in which is compiled the available information on these useful rotator devices. Copies of this publication are available from Du Pont for distribution among field and service engineers who may want to recommend such equipment.

## LITERATURE AVAILABLE

The Petroleum Chemicals Division of Du Pont has published a wide variety of material of interest to the petroleum industry. This includes technical papers, bulletins, reports and memoranda as well as equipment operation bulletins, safety regulations, tank cleaning data, marketing aids and the like.

Any of this is available on request to your nearest Du Pont Petroleum Chemicals Division District Office. A partial listing of available material is shown below:

Precombustion Reactions in a Motored Engine . . . . . Serial A-607

The Effect of Hydrocarbon Structure on the Road Antiknock Performance of Motor Fuels . . . . . Serial A-505

Du Pont Gasoline Antioxidants Nos. 5, 6 and 22—Their use and application for improving gasoline storage stability—Bulletin No. A0-50 . . . . . Serial A-513

Du Pont Oil Blue A — An Improved Blue Gasoline Dye Especially Developed for Aviation Gasolines . . . . . Serial A-515

Blending calculator for Du Pont TEL Compound (Motor Mix) . . . . . Serial A-7648

DU PONT

**Better Things For Better Living ...Through Chemistry**

# Petroleum Chemicals

**Make Du Pont the Source for All of Your Gasoline Additives . . . Tetraethyl Lead Compounds (Motor Mix—Aviation Mix)—Antioxidants—Metal Deactivator—Dyes**

**E. I. DU PONT DE NEMOURS & COMPANY (INC.)**
*Petroleum Chemicals Division • Wilmington 98, Delaware*

*District Offices:* New York, N. Y. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · Los Angeles, Calif.

*District Laboratories:* Wilmington, Del. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · El Monte, Calif.

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# USER REPORT:

## T. E. Mercer Equips Fleet with Warner Electric Brakes. Reports Savings in Maintenance on Brakes and Tires . . . reduced Insurance Rates . . . Improvement in Safety Rating

T. E. MERCER
TEAMING AND TRUCKING CONTRACTOR
600 East Fifth Street
FORT WORTH 1, TEXAS

ADDRESS REPLY TO
BOX 671
LONGVIEW, TEXAS

Mr. L. H. Hampton
Warner Electric Brake Manufacturing Co.
2227 West Jefferson
Dallas, Texas

Dear Sir:

About 2½ years ago we installed the first pair of Warner Electric Brakes on a pipe trailer. Since that time we have equipped all our pipe trailers with your brakes, which means we have approximately 50 pairs in service.

A large portion of the cost of the brakes has been offset by a reduction in insurance rates, savings in maintenance on tractor brakes, and tires. Our drivers are pleased with the performance of electric brakes. You will also be interested to hear that our safety rating has risen considerably.

We thought you would like to know why we are Warner Electric Brake boosters.

Yours very truly,

T. E. MERCER
TEAMING AND TRUCKING CONTRACTOR

By W. C. Chambers

WCC:pab

A NEW user — or an old customer — their opinions about Warner Electric Brake performance, safety, maintenance are always the same. The experience of Mr. Chambers of the T. E. Mercer Company is typical.

Warner Electric Brakes are fast and positive acting. Because they operate *electrically*, they give faster action and braking control not possible with any other kind of brakes. What's more, their mechanical simplicity and rugged construction make them extremely economical to maintain. Many users are still operating Warner Electric Brakes originally purchased 10, 15 and 20 years ago!

Write for illustrated literature explaining their many advantages.

**WARNER ELECTRIC BRAKE & CLUTCH CO.**
**Dept. OGJ, BELOIT, WISCONSIN**

**WARNER**
ELECTRIC BRAKES

**SINCE 1927**



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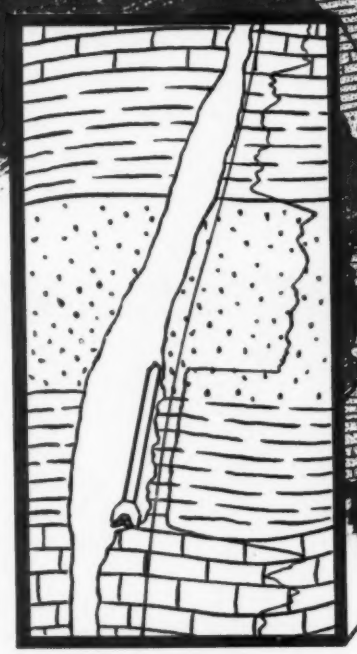
# LOCATE "FISH" WITH SCHLUMBERGER ELECTRICAL LOG



## MANY OPERATORS USE THE SCHLUMBERGER ELECTRICAL LOG AS AN AID IN DETERMINING THE DEPTH AT WHICH A "FISH" IS LODGED

Because the electrical resistivity of steel is many times less than that of the ground, anomalies on the electrical log caused by lost drill collars, joints of drill pipe, and parted casing are very definite. It is possible to save many hours on a fishing operation by appropriate use of the Schlumberger Electrical Log.

The next time you are faced with a fishing operation, call your Schlumberger Engineer.

SCHLUMBERGER

Schlumberger's progressive policy of research and engineering continues to provide advanced services to the oil industry.

SCHLUMBERGER WELL SURVEYING CORPORATION • HOUSTON

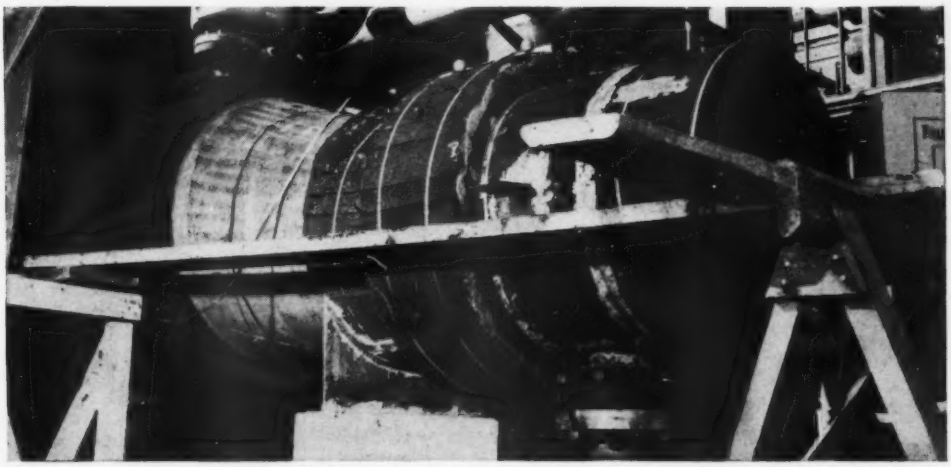
# It costs you less money

**PC FOAMGLAS**
the long life insulation

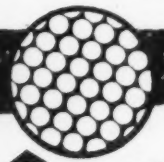
The wide acceptance of PC Foamglas—evidenced by a long list of prominent users—is due mainly to two facts. It is an effective insulation. It is an economical insulation.

Its cellular glass structure enables Foamglas to give many years of efficient, trouble-free insulating service on hot and cold piping and fittings—indoors and outdoors—on towers, tanks, and processing equipment. Its freedom from costly maintenance, repairs and replacement is another important factor in keeping insulating costs down to rock bottom.

When next you figure on insulation, consider the money-saving advantages of Foamglas on a cost-per-year basis. If you are facing special insulating problems, our specialists will be glad to consult with you. Meanwhile, you will find a lot of helpful information in our current literature. Just send in the convenient coupon and your free copy of our booklet will be forwarded promptly, with a sample of PC Foamglas.



This processing equipment at the new oxidation plant of McCarthy Chemical Company, Winnie, Texas, is being insulated with PC Foamglas. In addition to curved segments, beveled lags and standard flat blocks on equipment, preformed sections of Foamglas have been used on pipe lines at this plant. *Insulation Contractor:* The Aber Company, Inc., Shreveport, Louisiana.



***This diagram shows*** how a group of glass bubbles, which contain still air, can form a continuous, cellular material. The black area is glass, the white space is air. PC Foamglas, the cellular glass insulating material, consists of glass and still air, makes an excellent barrier to heat travel. And, being glass, Foamglas has unusually high resistance to moisture, vapor, fumes and acid atmospheres, is noncombustible, odorless and verminproof. In this cellular glass construction lies the secret of the long lasting insulation value of PC Foamglas.

Pittsburgh Corning Corporation
Dept. DD-21, 307 Fourth Avenue
Pittsburgh 22, Pa.

Please send me without obligation, a sample of Foamglas and your FREE booklet on the use of PC Foamglas Insulation for industrial insulation.

Name .....

Address .....

City ..... State .....

PITTSBURGH® PC CORNING

**FOAMGLAS cellular glass INSULATION**

*... when you insulate with FOAMGLAS ... the insulation lasts!*

Where
Gases,
Fumes and Smoke
are present

# AO 701 RUBBER FRAME GOGGLE provides a gas-tight seal!

Companion model to AO's "700" Rubber Frame Goggle, the AO "701" is recommended where gas, fume and smoke hazards exist. There are no ventilation slots in the frame and the lenses have no hole for the strap. Acid resistant bolts and nuts replace strap on front of frame. Vinylite lens. GOGGLE MAY BE WORN OVER PERSONAL GLASSES. Your nearest AO Safety Products Representative can supply you.

**QUICK FACTS**

- Protects eyes against chemical splashes, spray, flying particles and fine dusts, as well as fumes, smoke and gases.
- Frame is molded for air-tight fit of non-irritating, acid-resisting neoprene.
- Bridge and other face-contacting edges have broad bearing surfaces for maximum comfort.
- Rubber headband is extra wide, easily adjustable.

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

*Southbridge, Massachusetts • Branches in Principal Cities*

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Modern methods, backed by years of experience, make TESCO your most dependable source of steel castings.

TEXAS ELECTRIC STEEL CASTING CO.

GOOD CASTINGS TESCO CARBON AND ALLOY STEEL HOUSTON, TEXAS

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# What they say!

"We use your Helicoid Gages in very severe pulsation work and have found them very satisfactory."

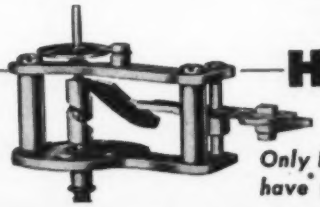
"A Helicoid Gage operating under the worst conditions for 4,000 hours is still functioning, although other gages have been worn out."

"... no other gage has come close to giving such long life and accuracy as the Helicoid."

"Your Helicoid Gages have been used in our plant for more than five years and have proved their superiority over competitive makes."

"We have six gas engines equipped with Helicoid Gages on the oiling sys em, subject to more vibration than any rack and pinion gage will stand."

***All quotes are taken from letters in our files. Write today for HELICOID GAGE catalog.***



**HELICOID**

***Only Helicoid Pressure Gages have the Helicoid Movement***

ACCO

HELICOID GAGE DIVISION
AMERICAN CHAIN & CABLE COMPANY, INC.
Bridgeport 2, Connecticut


# They Say—

### Depletion Deduction

"President Truman sends to Congress again his demand for a decrease in the tax deduction allowed oil and gas companies to offset depletion. Congress has turned it down before on the ground that it will restrict oil and gas exploration. Congress is right; it cannot be figured any other way.

"The present deduction of 27½ per cent of gross income has been accepted on the basis of past experience. And exploration experience is getting tougher from year to year. A smaller percentage of wildcat wells is being brought in. More marginal wells are being discovered. The average depth of wells is increasing.

"In the face of the present world situation, the country is more in need of oil than of almost any other material. Nothing should be done to endanger a program of steady exploration. Even from the standpoint of future tax revenue, the President's demand is on the order of killing the goose that lays the golden egg. The more exploration we have, the more oil we will have and the more tax revenue in the long run."

—*Editorial in the Dallas Morning News.*

### Want Copies of Index

Sir:

Accepting your offer on Page 23 of the February 1, 1951, issue, *(Journally Speaking)*, please send me a copy of the 1950 Index of The Oil and Gas Journal. Thank you also for the Dewey decimal classification number of 050.

A. Roger Denison,
Amerada Petroleum Corp.,
Tulsa, Okla.

Sir:

This is to request the 1950 index to your publication which is sent to subscribers free of charge.

My present subscription expires on 8-11-51. I find The Oil and Gas Journal to be very informative and an excellent means of keeping up with current developments in the oil industry and this is also to express appreciation for the many services offered by your department.

Roy M. Bauer, Jr.,
Andrews, Tex.

### We're Not Self-Sufficient

"Discussions at this time of the degree to which this country is self-sufficient in its petroleum resources appear to me to be futile. In an future emergency as in the last wa

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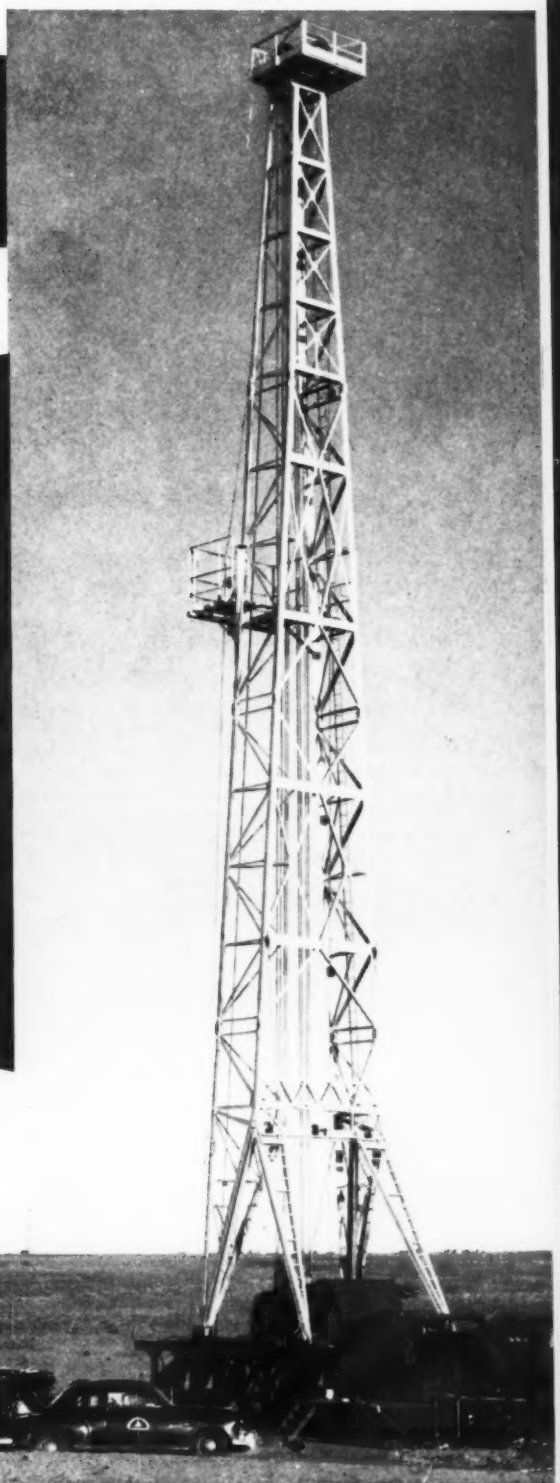
# WHAT IS THE "Depth Expectancy" OF A LEE C. Moore 142 FOOT MAST?

Experience in drilling with a Moore 142 foot mast shows that depths far below average can be reached. Wells below 15,500 feet have already been drilled with this big mast.

Lee C. Moore Big Masts are designed for big jobs. So far no job has been too big. Check their strength, ruggedness and durability, and you'll see why the toughest drilling job is in good hands when you use a Lee C. Moore Big Mast.



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# fishin' is fun . . . with care on the run

Here's a fellow that enjoys complete relaxation. He knows his plant is safeguarded from fire . . . a short circuit, a stray spark, a forgotten cigarette or spontaneous combustion can't cut into production time, destroy valuable records or endanger the lives of employees.

You too, can have this same peace of mind about fire by fully protecting your investment in materials, equipment and buildings with modern, approved C-O-TWO Fire Protection Equipment.

No matter what your property . . . factory, mill, warehouse, power station or research center . . . or a particular fire hazard such as spray booth, dip tank, pump room, electrical equipment enclosure or record vault . . . there is a type of C-O-TWO Fire Protection Equipment that gives you fast, positive action the instant fire strikes. Whether it's a C-O-TWO Squeez-Grip Carbon Dioxide Type Fire Extinguisher for an incipient fire, or a C-O-TWO Built-In High Pressure or Low Pressure Carbon Dioxide Type Fire Extinguishing System for total flooding an entire fire hazardous area . . . C-O-TWO means experienced engineering that assures you of the best type equipment for the particular fire hazard concerned.

For example, at many locations a C-O-TWO Combination Smoke Detecting and Fire Extinguishing System is a "must". The first trace of smoke in a protected area sounds an alarm . . . then fast, clean, non-damaging, non-conducting carbon dioxide blankets the fire, putting it out in seconds, before it spreads and causes extensive damage.

So, let an expert C-O-TWO Fire Protection Engineer help you in planning complete and up-to-date fire protection facilities now. Write us today for complete free information . . . our experience is at your disposal.

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**C-O-TWO FIRE EQUIPMENT COMPANY**

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Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

numerous foreign operations, both those of United States ownership and those controlled by British and Dutch interests, will undoubtedly be of high strategic significance. Even in peacetime, the United States Navy depends on overseas operations for considerable supplies of petroleum products and there is also, as you are undoubtedly aware, a considerable movement of crude petroleum from foreign producing areas to this country. Moreover, the plans for continued recovery in the ERP countries are based, to a considerable extent, on a greater availability of petroleum in those countries.

"In addition to the foregoing considerations there is the question of the support of the petroleum operations of both United States and foreign ownership within the borders of our 'Good Neighbors,' the Latin-American countries such as Mexico, Venezuela, Colombia, Chile, and others.

"A great deal of the pipe and other steel for world petroleum operations outside the United States is obtained from Europe and some is supplied from local industry, as in Mexico and in Chile. For some quantity of these products, however, foreign petroleum operations must rely on United States sources of supply either because of the inadequacy of the supply available from foreign industry or because of the unique quality or design of United States products in this line in which this country so greatly excels.

"The problems arising therefore in the limitation of exports of the steel products are many and involved. I can assure you, however, that the requirements of the domestic petroleum as well as all other domestic industry are receiving serious and continued study and that all determinations with respect to exports are made in the light of these studies."

*Thomas C. Blaisdell, Jr., assistant secretary of commerce, in a letter to Russell Brown, general counsel, I.P.A.A.*

# CALENDAR

**1951**

**February**

Missouri School of Mines and Metallurgy, water-flooding symposium, Rolla, Mo., February 23.

Wisconsin Petroleum Association, annual convention and equipment show, Milwaukee Auditorium, Milwaukee, February 27-28

San Joaquin Valley Oil Producers Association, annual meeting, Bakersfield Inn, Bakersfield, Calif., February 28.

**March**

American Association of Petroleum Geologists, Rocky Mountain Section, Shirley Savoy Hotel, Denver, March 1-2.

New York Oil Heating Association, Inc., Hotel Statler, New York, March 5.

American Society for Testing Materials, spring meeting and committee week, Cincinnati, March 5-9.

American Petroleum Institute, division of production, southwestern district meeting,

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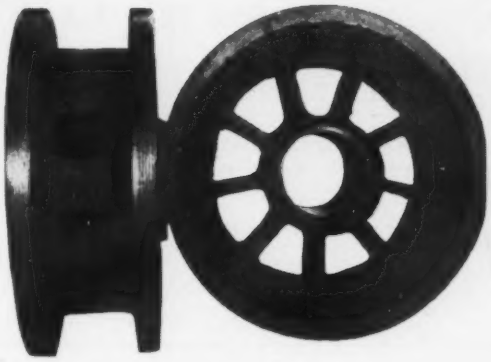
# Now its worn out...

*Note the slant of the level which indicates extent of rim wear on this shovel idler wheel*

# NOW IT ISN'T!



*Automatically rebuilt with Stoody High Carbon and hard-faced with Stoody 105, idler is now better than new!*

## STOODY HARD-FACING ALLOYS

**reclaim worn and discarded parts for new records and service!**

A worn part isn't always a useless part—in fact, Stoody Hard-Faced parts are generally *better* than new replacements. *They give more life*—last two or more times longer. *They cut replacement costs. They eliminate downtime for changes. They save labor costs!*

Stoody Hard-Facing Alloys can be applied to a wide variety of equipment—both on surface tools—tractors, shovels, ditchers—and on subsurface equipment such as drilling bits, tool joints, drill collars.

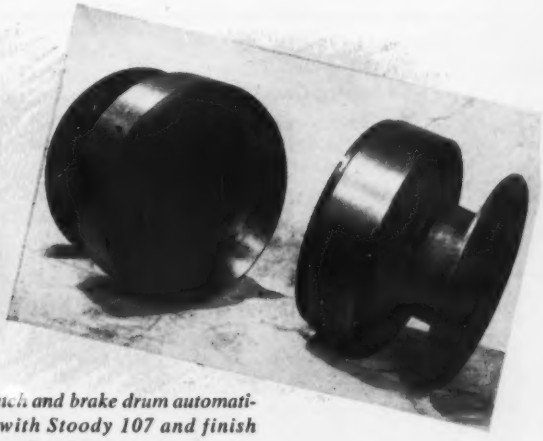
To get more life from all equipment—to save on steel, hard-face with Stoody Alloys today. It's good wear-insurance at all times . . . extra important when replacements are difficult or impossible to obtain!

**AUTOMATIC HARD-FACING SERVICES**—Much equipment is now being hard-faced automatically by independent job shops with big savings in time, improved appearance and lower cost. Names of organizations nearest you and equipped for automatic hard-facing will be forwarded upon request.

**STOODY COMPANY** 11938 East Slauson Ave., Whittier, California

ABOVE

*Typical appearance of automatically hard-faced tool joint. Alloys: Stoody 102 and Stoody 130.*



RIGHT

*Power Take-Off clutch and brake drum automatically hard-faced with Stoody 107 and finish ground on faces.*

RIGHT

*Tractor Rollers are almost smooth as new with this automatic application of Stoody 105.*



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IF YOU'RE NOT USING

# "FIST-GRIP" CLIPS

YOU'RE ASKING FOR TROUBLE! Here's Proof!

WRONG and RISKY!

Tightening of nuts on ordinary U-bolt clips pulls wire rope into bowed shape, crushes rope, endangers safety.

In use, rope between U-bolt clips is crimped under tension, leading to further damage and early breakage.

Laughlin "Fist-Grip" Safety Clips grip the rope in four bearing-surfaces, holding it straight without damage or distortion.

Keeping the rope straight under working tension, "Fist-Grip" Clips deliver 95% to 100% of the rope's rated breaking strength.

RIGHT and SAFE!

## You Get All These Benefits Only With "FIST-GRIP" Clips

**Won't crimp or crush** — pre-formed or regular lay wire rope; leaves them full strength for safety and longer life.

**Simple, easy to put on** — saves time, manpower; can be put on with *any* type wrench.

**100% foolproof** — can't be put on backward.

**Sure grip** — two clips do the work of three.

**Extra strength and safety** — only type of clip where entire clip, including bolts, is drop-forged.

Distributed through mine, mill and oil field supply houses.

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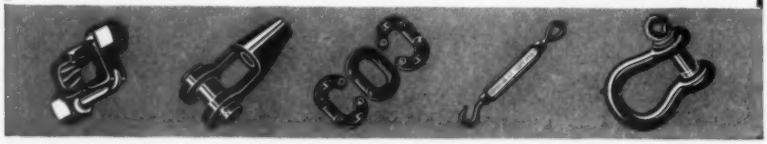

Hotel Beaumont, Beaumont, Tex., March 7-9.

Indiana Independent Petroleum Association, spring convention and refiners and suppliers exhibit, Hotel Severin, Indianapolis, March 8-9.

Texas Oil Jobbers Association, Inc., spring convention and refiners and suppliers exhibit, Shamrock Hotel, Houston, March 9-10.

Mid-West Gas Association, Hotel Fontenelle, Omaha, March 12-14.

First South American Oil Congress, Montevideo, Uruguay, March 12-16.

Illinois Petroleum Marketers Association, annual convention, Sherman Hotel, Chicago, March 13-15.

National Association of Corrosion Engineers, annual conference and exhibition, Statler Hotel, New York City, March 13-16.

Gas Appliance Manufacturers Association annual meeting, The Homestead, Hot Springs, Va., March 19-21.

Ohio Petroleum Marketers Association annual convention and marketing exposition, Deshler-Wallick Hotel, Columbus Ohio, March 20-22.

American Petroleum Institute, division of production, Mid-Continent district spring meeting, Herring Hotel, Amarillo, March 21-23.

North Texas Oil and Gas Association, annual meeting, Kemp Hotel, Wichita Falls, Tex., March 24.

Texas Independent Producers and Royalty Owners Association, fifth annual meeting, Beaumont, Tex., March 27-28.

New England Gas Association, annual meeting, Hotel Statler, Boston, March 29-30

**April**

American Gas Association, industrial and commercial gas section, conference on industrial and commercial gas, Shoreham Hotel, Washington, D. C., April 2-4.

American Society of Mechanical Engineers, spring meeting, Atlanta, April 2-5

Oil-Heat Institute of America, annual convention and National Oil-Heat Exposition, Navy Pier and Palmer House, Chicago, April 2-6.

Instrument Society of America, New Jersey section, Essex House, Newark, N. J., April 3.

American Petroleum Institute, division of production, Eastern district meeting, Deshler-Wallick Hotel, Columbus, Ohio, April 3-5.

Midwest Power Conference, fourteenth annual meeting, Sherman Hotel, Chicago, April 4-6.

New York Oil Heating Association, Inc., Hotel Statler, New York, April 9.

Mid-West Regional Gas Sales Conference, Edgewater Beach Hotel, Chicago, April 9-11.

Michigan Petroleum Association, annual spring convention, Detroit Leland Hotel, Detroit, April 10-11.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, April 10-12.

American Institute of Electrical Engineers, District 4 meeting, McFadden-Deauville Hotel, Miami, April 11-13.

American Gas Association, distribution, motor vehicle, and corrosion conference, Hotel Peabody, Memphis, April 16-18.

American Society of Lubrication Engineers, annual convention and lubrication show, Bellevue-Stratford Hotel, Philadelphia, April 16-18.

National Petroleum Association, Hotel Cleveland, Cleveland, April 18-20.

American Petroleum Institute, Rocky Mountain district spring meeting, Gladstone Hotel, Casper, Wyo., April 19-20.

Brussels International Fair, twenty-fifth annual event, Brussels, Belgium, April 21-May 6.

Southern Gas Association, Buena Vista and Edgewater Gulf hotels, Biloxi, Miss., April 23-25.

American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, Society of Exploration Geophysicists, joint annual meeting, Jefferson Hotel, St. Louis, April 23-26.

Natural Gasoline Association of America, annual convention, Mayo Hotel, Tulsa, April 25-27.

Indiana Gas Association, French Lick Springs Hotel, French Lick, Ind., April 26-27.

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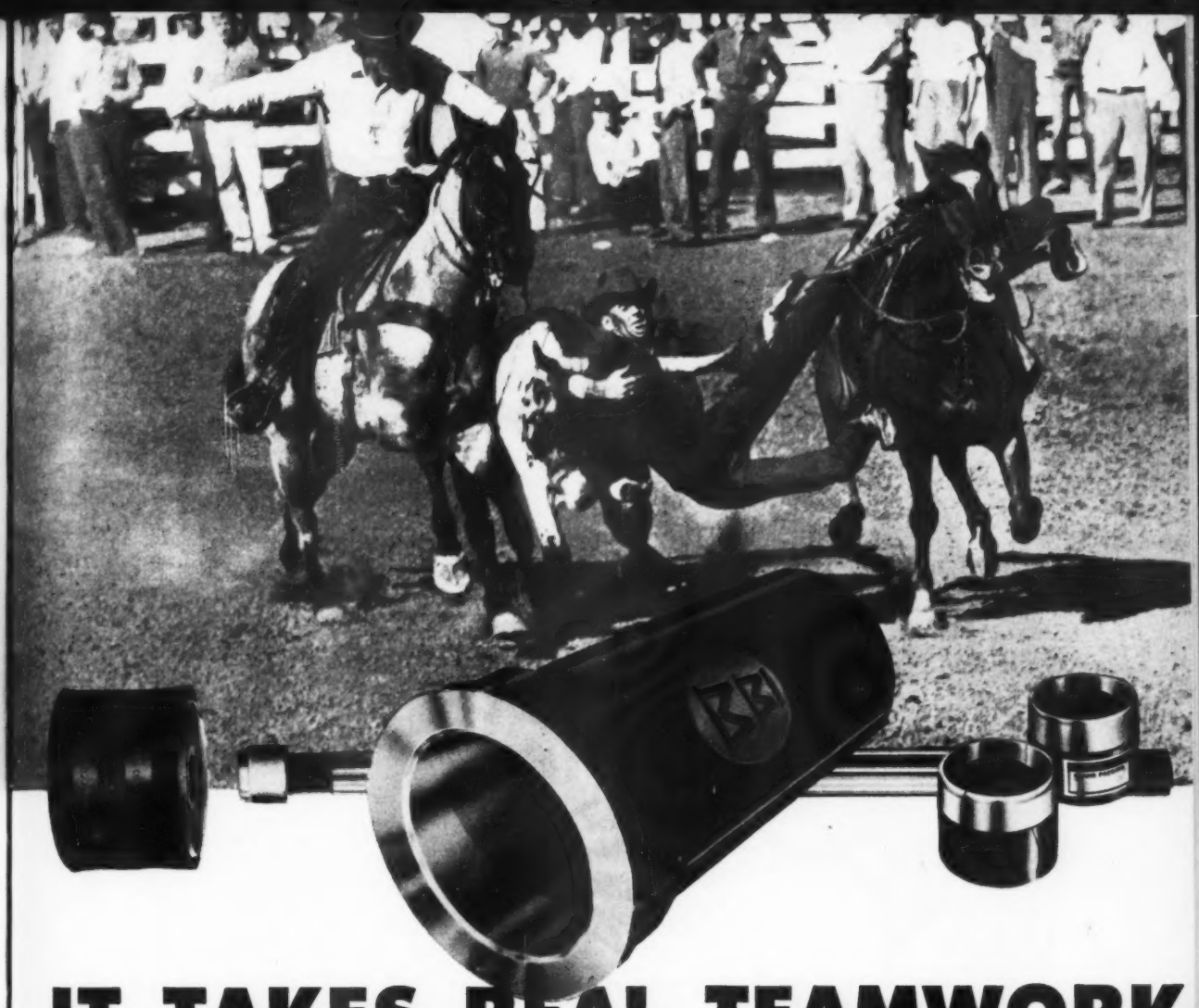

# IT TAKES REAL TEAMWORK

**to wrestle steers . . . and to assure *efficient* slush pump operation**

Barehanded throwing of wild steers is so daring and dangerous a sport that it long ago became the "big wallop" of every rodeo. Successful steer wrestling demands precision teamwork by hazer, wrestler, and horses.

Efficient slush pump operation also requires precision teamwork. Piston, Rod, Liner and Packing must be in perfect alignment, have perfect fit, and work together with perfect mechanical precision! Valves must be rugged and efficient.

We have perfected the new MISSION "Super Service" Liner . . . accurately bored, ***induction*** hardened to ***uniform*** case thickness, precision honed, and "Satin Finished" . . . to enable you to obtain the same top quality in liners that you obtain in MISSION Pistons, Rods, Packing and Valves. These products constitute a perfectly mated "MISSION team" of expendable slush pump parts, ***unbeatable*** for economical slush pump service. Your supply store handles them . . . Mission Manufacturing Co., Houston, Texas. Export: 30 Rockefeller Plaza, New York. European Address: London, England.

Mission Silver Top Valve for Normal Pressures

Mission Super-Service Valve for High Pressures

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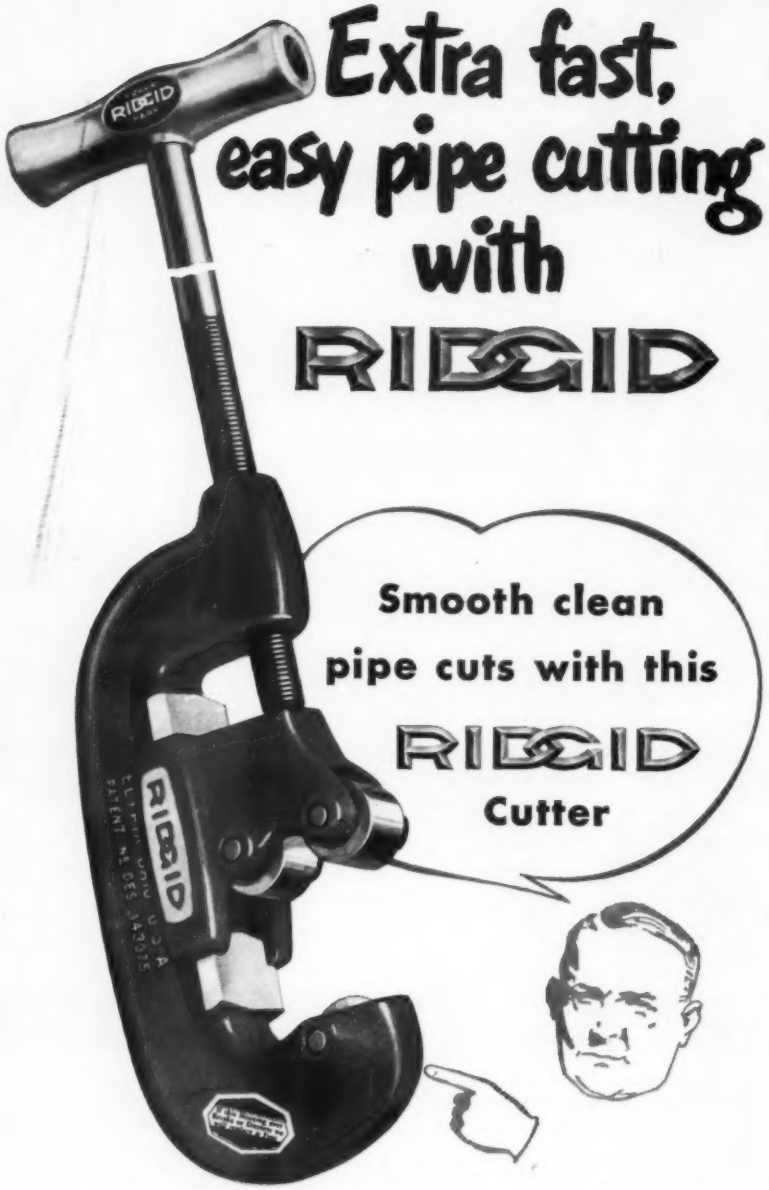
# Extra fast, easy pipe cutting with RIDGID




• It rolls right through any pipe with least effort, quick almost burrless cuts—factory tested, tracks perfectly. Special thin-blade cutter wheel for extra fast cutting—or heavy-duty wheel for extra long service. Guaranteed warp-proof special malleable housing. Five models to 6" pipe; 4-wheel short-handle models for speedy cutting in tight places. For tops in clean easy pipe cutting, buy RIDGID Cutters at your Supply House.

RIDGID

★ Work-Saver Pipe Tools ★


Interstate Oil Compact Commission, spring meeting, La Fonda Hotel, Santa Fe, N. M., April 26-28.

American Gas Association, industrial and commercial gas section, industrial gas school, William Penn Hotel, Pittsburgh, April 29-May 4.

American Geophysical Union, thirty-second annual meeting, National Academy of Sciences, Washington, D. C., April 30-May 2.

American Petroleum Institute, division of refining, sixteenth mid-year meeting, Mayo Hotel, Tulsa, April 30-May 3

Materials Handling Conference, International Amphitheatre, Chicago, April 30-May 4.

**May**

American Institute of Electrical Engineers, District 1 meeting, Hotel Syracuse, Syracuse N. Y., May 2-4.

New York Oil Heating Association, Inc., Hotel Statler, New York, May 7.

American Gas Association, Natural-Gas Department, Dallas, May 7-8.

Independent Petroleum Association of America, mid-year directors' meeting, Cosmopolitan Hotel, Denver, May 7-8.

Gas Appliance Manufacturers Association, natural-gas department spring meeting, Dallas, May 7-9.

Liquefied Petroleum Gas Association, annual convention and trade show, Stevens Hotel, Chicago, May 7-10.

American Petroleum Institute, division of production, Pacific Coast district, spring meeting, Biltmore Hotel, Los Angeles, May 10-11.

American Institute of Chemical Engineers, regional meeting, Hotel Muehlebach, Kansas City, May 13-16.

American Gas Association, operating section, production and chemical conference, Hotel New Yorker, New York City, May 14-16.

Pennsylvania Gas Association, Wernersville, Pa., May 15-17.

American Institute of Electrical Engineers, District 5 meeting, Loraine Hotel, Madison, Wis., May 17-19.

Empire State Petroleum Association, Inc., Hotel Statler, Buffalo, N. Y., May 20-22.

American Petroleum Institute, division of marketing, mid-year meeting, Cincinnati, May 28-29.

Third World Petroleum Congress, Kurhaus, Scheveningen, the Netherlands, May 28-June 6.

American Petroleum Institute, standardization and standing committees, division of production, mid-year meeting, Brown Palace Hotel, Denver, May 28-June 1.

**June**

Society of Automotive Engineers, Inc., summer meeting, French Lick Springs Hotel, French Lick, Ind., June 3-8.

New York Oil Heating Association, Inc., Hotel Statler, New York, June 4.

American Society of Mechanical Engineers, semiannual meeting, Toronto, Ont., Canada, June 11-15.

Pennsylvania Grade Crude Oil Association, 1951 annual meeting, Hotel William Penn, Pittsburgh, June 14-15.

Canadian Gas Association, Bigwin Inn, Lake of Bays, Ont., Canada, June 16-20.

American Society for Testing Materials, annual meeting, Atlantic City, N. J., June 18-22.

**NOMADS**

**Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.**

**Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.**

**Houston Nomads, second Monday of each month. Ye Ole College Inn, Houston.**

**Los Angeles Nomads, second Wednesday of each month, Jonathan Club.**

**New York Nomads, first Monday of each month, Louis Sherry's, 300 Park Ave.**

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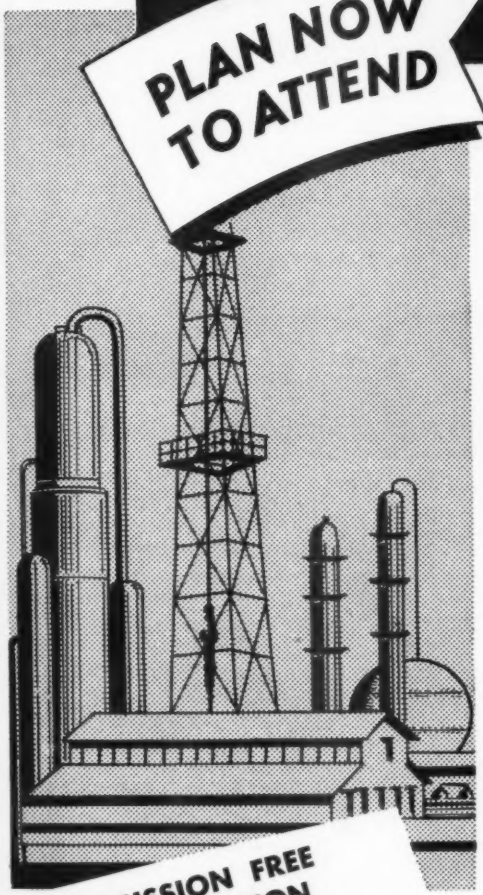

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. . . and its application to modern oil field drilling and producing techniques.

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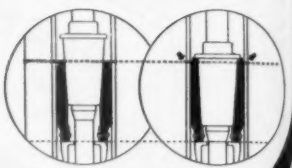
FOR DEEP HOLES ... HIGH PRESSURES!

## TYPE GM AMERICAN IRON

# CONTROL HEAD PACKER

**CHECK THESE IMPORTANT AMERICAN IRON FEATURES:**

- ✓ Specially engineered dovetail slips and guides!
- ✓ Patented lateral expanding cup assembly avoids crushing of the cup in this sealing element!
- ✓ All the seal is accomplished in one sealing element!
- ✓ Patented, American Iron simple-setting arrangement!
- ✓ Full tubing size opening through length of packer!
- ✓ Smooth running because of ample fluid by-pass area!

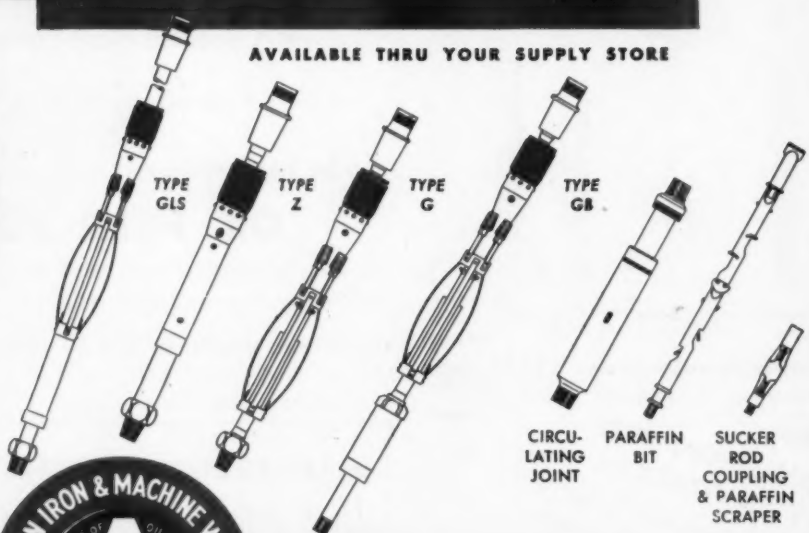


*Note how cup assembly is expanded laterally (not compressed) to avoid crushing!*

## GO "AMERICAN" ALL THE WAY

with this American Iron Production Equipment

**AVAILABLE THRU YOUR SUPPLY STORE**

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# JOURNALLY Speaking

## D & D International

WHEET-WHOO (which is as close as we can come to a wolf whistle) do they have good-looking gals in Canada! For proof, lamp the pic on this page. It's the officers and committee chairmen of the brand-new Desk and Derrick Club of Calgary.

There's another 400—that's right, 400—just like 'em in the membership, which proves something or other about the growth and vigor of Alberta oil and may explain why so many stateside oil men have become interested in wildcatting in those parts. The initial meeting last month was attended by 425 women members of the staffs of oil, supply, and service companies based in Calgary, and two male guests (lucky guys). The latter described the occasion as a "milestone on the history of the Canadian oil and gas industry," which we don't doubt.

These Alberta beauties modeled their organization on the original Desk and Derrick Club of New Orleans and became the sixth chapter in this lively outfit which in little more than a year is also flourishing in Los Angeles, Houston, Shreveport, and Jackson. Good going, girls.

## Inflation Note

IN these days of inflation the price of almost everything is going up and the value of the dollar is getting less no matter where you spend it. But our favorite oil publication is an exception.

You oil men can still get the Big Yellow Book for $3 a year, and it still contains $110—plus—worth of information measured by prewar dollars. But now there is an added value. In addition to all the priceless information, your $3 buys you about 50 lb. of paper during the course of a year, and with the price of waste paper going up you can get a big hunk of your money back by selling your old files and this will give you your needed knowledge at a greatly reduced cost. If you know of any better bargain these days we'd like to hear about it.

## Can't Tell One Either

THE date of this issue of our favorite oil publication coincides with Washington's birthday, an event which, if our astronomy is correct, happens approximately every 7 years.

A further parallelism and claim to spiritual kinship with the Father of Our Country is mutual association with the aversion to telling an untruth. Today everything is decorated with hatchets and cherries, and today arrives the Big Yellow Truth-Teller.

At the risk of destroying this comparison—and only because of our devotion to truth—we might point out that killjoy historians say Young George never owned a hatchet, never chopped down a cherry tree, and never told his pop, "I cannot tell a lie." However, the First President had a pretty good lifetime record for truth, and we think we have, too (if you let us get away with blaming all mistakes on the proofreader). Anyway, our devotion to truth is just as great, and we hope history will be as kind. Move over, George; we're going in for hatchets and cherries, too.

*—Henry D. Ralph*



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FOR OIL INDUSTRY CHEMICAL SERVICE

The OIL AND GAS JOURNAL

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C. O. WILLSON

MANAGING EDITOR
Kenneth B. Barnes

NEWS EDITOR
Henry D. Ralph

REFINING EDITOR
George H. Weber
415 Lexington, New York

INTERNATIONAL EDITOR
Dahl M. Duff
415 Lexington, New York

PIPE-LINE EDITOR
Paul Reed

TECHNICAL EDITOR
W. L. Nelson

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ART DIRECTOR
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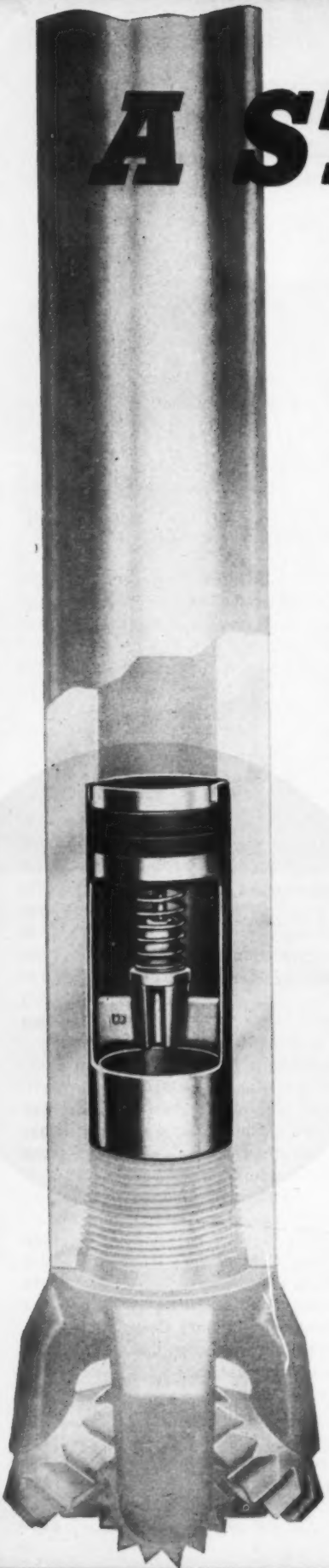

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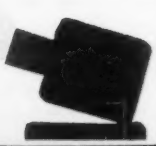

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**DRILL PIPE FLOAT**

# Blueprint for Oil

A blueprint for the petroleum industry during the next year or two is emerging from the defense planning in Washington. The confusion and improvising of last fall have been resolved into a program in which oil has a very definite place.

The program is based on the assumption, or calculated risk, that there will be no world war this year or next. In the meantime our war potential is to be built up rapidly to such a size that no other power will dare to start a war, and this state of high preparedness will be continued indefinitely.

Petroleum is recognized as a war industry, and its capacity is to be expanded. The announced goal is a reserve producing capacity of 1,000,000 bbl. per day of crude, with commensurate increases in transportation and refining facilities. The industry must bear the cost of maintaining this unused capacity, but it has carried similar loads in the past.

Steel and equipment to achieve this goal will be made available to the industry. Supplies will not be plentiful; there will be delays and annoyances, and operators must conserve and improvise. But within its allotment of steel the industry will be permitted to plan and execute with a minimum of governmental direction.

The control pattern of oil is fairly well crystallized. The industry has sent some of its best men to staff the defense agencies, and they are operating in an atmosphere favorable to business. The objective is guidance toward the goal of war readiness, with no more compulsion and specific regulation than absolutely necessary.

Price regulation is still unclear and always will be a problem, but there is evidence that some of the mistakes of the last war will be avoided. The hope is to prevent inflation while retaining sufficient flexibility to encourage production and ease hardships. Taxes will be heavy but not discriminatory—except for the attack on the depletion allowance, which is not a part of defense planning.

Civilian markets for petroleum products will not be curtailed arbitrarily unless there is an unforeseen emergency. Higher taxes on gasoline may reduce the consumption of motor fuel by some, there may be fewer new oil burners and passenger automobiles, and expansion of new markets for natural gas may be checked in certain areas, but the higher levels of industrial activity will bring increased demands for all products.

Such is the blueprint. It charts a difficult but by no means impossible or unaccustomed course. More details remain to be filled in, more problems will arise, but the outline is a practical one in the light of what confronts the nation. Now that petroleum's preparedness program is taking definite form, individual operators can fit their plans into it and the industry as a whole can knuckle down to the job of providing the expanded capacity needed to fight—or prevent—a war.

# THIS WEEK

**OCTANES**—PAD cancels plans for octane ceilings on motor gasolines in effort to conserve tetraethyl lead. . . . Instead, it will allocate product to dealers in effort to spread supplies. . . . ¶Agency's deputy administrator asks for comments. . . .

**WASHINGTON**—PAD reaching maturity, with most key posts filled, although several divisions remain to be set up, it can now cope with any problem. . . . ¶Agency preparing forms to serve as statistical basis for allocation of tubular goods. . . . ¶Secretary of Interior Chapman sees possibility of oil deficiency in next 10 years but thinks situation could be quickly corrected by new discoveries, synthetics, imports. . . . ¶NPC committee, studying ways of stepping up oil production in Western Hemisphere, to call for present tax provisions, settlement of tidelands-management dispute. . . . ¶OPS working up orders for regulation of oil-industry prices. . . .

**TIDELANDS**—Hearings get under way before Senate committee on temporary legislation for operation of submerged areas. . . . Korean War, defense program may cause group to favor O'Mahoney proposal. . . .

**PRODUCTION**—Steady upward trend in world crude-oil production interrupted in December as result of U. S. drop, but most foreign areas establish new records. . . . ¶Texas allowable set at 2,800,742 bbl. daily for March, representing 23 producing days. . . . ¶Operators in shallow Willow Springs field of California probably establishing quick-payout record. . . . ¶Atlantic Refining Co. says its new gas-injection method for increasing recovery of oil has proved successful in initial tests. . . .

**REFINING**—Atlantic Refining Co. introduces new refining process which promises high-octane yield, crude conservation, and versatile operation. . . . ¶Pan-Am Southern Corp. nearing completion on new fluid catalytic cracking unit at its El Dorado, Ark., refinery. . . . ¶Sunray's catalytic cracking unit at Duncan, Okla., back on stream after 29-day turnaround following record run. . . .

**CANADA**—Eastern Canada activity high, with Union Gas, other firms engaged in exploratory programs. . . . ¶Canadian Senate hears second reading of bill proposing incorporation of new pipe-line company to build line which would move oil from Alberta to eastern Canada. . . . ¶Decision on declaring natural-gas line from Alberta to Pacific Northwest necessary to defense of continent delayed by U. S. mobilization director. . . .

**ACTIVITY**—Crude production averaged 5,850,000 bbl. daily for week ended February 17, up 51,375 bbl. daily from previous week. . . . ¶Total wells drilled decreased to 603 for the week from 684 for the week ended February 10. . . . Wildcat completions totaled 121 for the week compared with 144 for same week last year. . . . ¶Rotary rigs operating in United States on February 12 increased to 2,105 rigs compared with 2,018 a week earlier and 1,897 on same date last year. . . .

**TRENDS**—The increase in Texas allowables may boost crude and field-condensate production to about 6,000,000 bbl. daily in March. . . . Total new supply of all oils will be about 7,500,000 bbl. daily in March. . . . In addition to crude, natural gasoline and cycling-plant production is forecast at about 540,000 bbl. daily and total imports at about 960,000 bbl. daily. . . .

**INTERNATIONAL**—Australia abandons shale-oil effort after 10 years, due to high costs. . . . ¶Two oil companies engaged in exploration work in New Guinea despite tremendous difficulties. . . .

**PIPE LINES**—Tennessee Gas Transmission, Northeastern Gas Transmission let contract for 175-mile natural-gas line from Albany to Wilmington, Mass., to Oklahoma Contracting Co. . . . ¶Panhandle Eastern lets contract for 130 miles of 30-in. gas loops, 44 miles of 26-in. to Conyes Construction Co. . . . ¶Sinclair Pipe Line moves purchasing department to Independence, Kans. . . .

*LOOKING UP.—Prospects for a high level of activity in the oil industry despite war restrictions are improving as government planners perfect a defense program designed to create a reserve producing capacity and impose a minimum of controls on the industry.*

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# PAD Maturing

## Several divisions remain to be set up, but agency, with 150 people, is now in position to deal with any problem

Bertram F. Linz

WASHINGTON.—The Petroleum Administration for Defense is rapidly building up an organization and now has a staff approaching 150 people, a good 20 per cent of whom saw service with the Petroleum Administration for War.

The facility security and distribution and marketing divisions are yet to be set up; the gas division is in the process of formation; and additional experts will be added in the other branches, but PAD now is in a position to deal with any problems that may develop.

Deputy Petroleum Administrator Bruce K. Brown of Pan-Am Southern Corp. has four assistant deputies—Hugh A. Stewart, chief of the Oil and Gas Division, as senior assistant; Alfred P. Frame, of Cities Service Oil Co. in charge of domestic-industry operations; and G. Stribling Snodgrass, of Bechtel Corp., in charge of foreign operations; Justin R. Wolf, who served as assistant general counsel of PAW, as general counsel—and eventually will have a fifth to head the gas division. Carroll D. Fentress, OGD director of refining, also is on Brown's staff, together with Edward B. Swanson, assistant director of OGD, as special assistants.

**Brown's plan.**—Brown's plan for organization of PAD is to get as many men with PAW experience into key posts as possible, as the nucleus around which a staff as large as may be necessary can be built, and a considerable number of wartime workers have already returned to Washington.

Of major importance because of the difficult equipment-supply situation is the materials division of which Frank A. Watts, of Humble Oil & Refining Co., is director, with Herbert H. Hansen, of Superior Oil Co., as his assistant.

The staff of the division currently includes W. Philip Cox, of Socony-Vacuum Oil Co., Inc., and Hudson Emery of The Texas Co., handling materials for foreign operations; Theodore H. Herman, Jr., of Tretolite Co., chemicals; Roy P. Wilson, of Sinclair Oil & Gas Co., and Edmond A. Hollingsworth, materials for refining; Otto E. McClatchey, of Sunray Oil Co., materials for oil pipe lines; George E. Oller, Jr., of Parkersburg Rig & Reel Co., supply manufacturers; Charles T. Reichert, of National Supply Co., and Walter A. Graham, of A. O. Smith Corp., pipe for producers; Lawrence V. Shaughnessy, who went to the Army Petroleum Board from PAW, marketing materials; Earl L. Struwe, formerly with the Bureau of Reclamation, statistics and accounting; and Charles E. Webber of Sun Oil Co., gas pipe lines.

**Production division.**—The production division is headed by Richard G. Lawton, of Lawton Oil Co., with Millard K. Neptune, of Phillips Petroleum Co. as his assistant, and includes Edward Babson, of Union Oil Co., handling reserves and productive capacity; Ralph Curtis, of Murphy Corp., materials for drilling; and Paul B. Whitney, of the Oil and Gas Division, statistics.

Reid Brazell, of Leonard Refineries, is director of the refining division, which includes Thomas L. Apjohn, of Socony-Vacuum; James W. Carroll, of Gulf Oil Corp.; Leo F. Connell, of Sun; Bruce W. Dunbar, of Shell Oil Co.; Donald P. Heath, of Socony-Vacuum; Walter C. Huffman, of Sun; E. Oliver Jones, of the Ethyl Corp.; David L. Neal, of Phillips; and Thomas W. Warren, of Humble.

Staff of the supply and transportation division consists of Dene B. Hodges, of Shell, director; and John W. Boatwright, of Standard Oil Co. (Ind.); John E. Boice, of the Oil and Gas Division; Paul D. Fell, of Sinclair; Minor S. Jameson, of the Independent Petroleum Association of America, and Benjamin Saurino, Sun.

**Foreign division.**—The foreign division is headed by Assistant Deputy Administrator Snodgrass and includes George T. Ballou, of Standard Oil Co. of California; George J. Coy, of Caltex Corp.; John A. Poulin, of the Oil and Gas Division; Frank Reeves, formerly with the Geological Survey, and Bernard Immerdauer, economist.

Arthur H. Forbes, of East Ohio Gas Co., and James V. O'Connor, of H. Zinder & Associates, Washington utility consultants, are the only experts so far secured for the gas division, which it is expected will be fully organized in the near future with an assistant deputy administrator at its head.

The program division, not yet fully staffed, is headed by Cecil L. Burrill, of Creole Petroleum Corp.

# Interior Report

## Chapman sees possibility of oil deficiency in next 10 years, but thinks situation could be quickly corrected

WASHINGTON. — Possibilities that the defense program may result in a deficiency of domestic oil within the next 10 years were raised last week by Interior Secretary Oscar L. Chapman in his annual report, but he expressed confidence that such a situation would be quickly corrected by new discoveries and in the interim our oil needs would be met by withdrawals from reserves, imports, or synthetics.

Pointing out that the defense program will impose heavy demands upon productive industries strained by the requirements of the last war, Chapman said the time has come for a reappraisement of our natural resources and adoption of a definite policy of use without waste.

"The success of our defense production effort will depend first of all upon the adequacy of our natural resources," he declared. "Lack of a plentiful and expanding supply of power, of minerals, or oil might defeat our cause. . . . These natural resources, however, are not inexhaustible and the stepup of our industrial production has meant their systematic depletion at an increasingly rapid rate.

**Hits waste, hoarding.** — "A realistic appraisal of our resources in relation to the growing needs of a dynamic industrial economy must lead to a rejection both of continued waste and the kind of conservation that consists of unsound and unnecessary hoarding. Our resources can be of value to us only if they are used. But we can never again afford to gorge and waste. Our remaining resources can serve most of our needs adequately, but only if we direct their development and exploitation wisely."

Discussing the fuel situation specifically, Chapman warned that "it is possible that the consumption of petroleum will exceed domestic discoveries during the next decade, particularly if defense needs should increase the drain greatly.

"Should this situation develop," he continued, "there will be a period of several years in which the discrepancy between current consumption and new discoveries will be met by withdrawal from reserves, increased imports from abroad, synthesis from



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oil shale, or a combination of these sources.

"We are forging a research and development program to furnish the scientific, engineering, and economic information required for the production of synthetic liquid and gaseous fuels from our abundant reserves of oil shale and coal," Chapman added. "In the laboratories and pilot plants of the Bureau of Mines, scientists and engineers are developing the processes for industrial uses which will assure ample supplies when the need arises."

**Properties listed.**—The department's report showed that at the end of the fiscal year June 30, the Geological Survey had 28,918 oil and gas properties under supervision in the public lands, aggregating 23,555,075 acres in 22 states and Alaska, an increase of 36 per cent in number and 24 per cent in acreage over the preceding year.

Drilling on public lands during the year included the spudding of 810 wells and the completion of 829, of which 571 produced oil and gas and 248 were dry, it was stated. In all, 15,049 wells, including 8,506 capable of production, were under supervision last June 30.

**Production.** — Production from the public lands during the year included some 76,000,000 bbl. of petroleum, 123,000,000 M.c.f. of natural gas, and 152,000,000 gal. of gasoline and butane, developing royalty returns of approximately $21,637,000 to the government.

On acquired lands, drilling included the spudding of 43 wells and the completion of 40, 23 of which were producers, and at the end of the year 150 wells, including 112 capable of production, were under supervision. Production from acquired lands for the year amounted to about 1,204,000 bbl. of crude, 569,214 M.c.f. of natural gas, and 1,428,000 gal. of gasoline and butane, from which the Government had a revenue of approximately $300,000.

**Indian leases.**—The survey reported that it also supervised operations on 6,552 leaseholds on Indian lands in 12 states which contained a total of 8,241 wells, 4,110 of which were productive of oil or gas, and 275 of which had been completed during the year. Total revenue from royalties, rentals, and bonuses amounted to $6,992,000.

The Bureau of Land Management reported the receipt of 16,000 noncompetitive oil and gas-lease applications during the fiscal year, compared with an average of 4,000 a year during the war and 7,000 in 1947.

## Steel Forms

### PAD drawing up plans for allotting tubular goods

WASHINGTON.—Forms on which producers will apply for tubular goods for their third-quarter operations are being whipped into shape by PAD and are expected to be sent out within the next few weeks.

These forms will be used to provide the statistical basis for the allocation of the 1,890,000 tons of tubular goods which the National Production Authority has agreed to make available to the industry this year. Formal allocation will start July 1.

Forms also are being prepared for the so-called 5 per cent set-aside of tubular goods on which operators can draw for wildcatting operations or in emergencies.

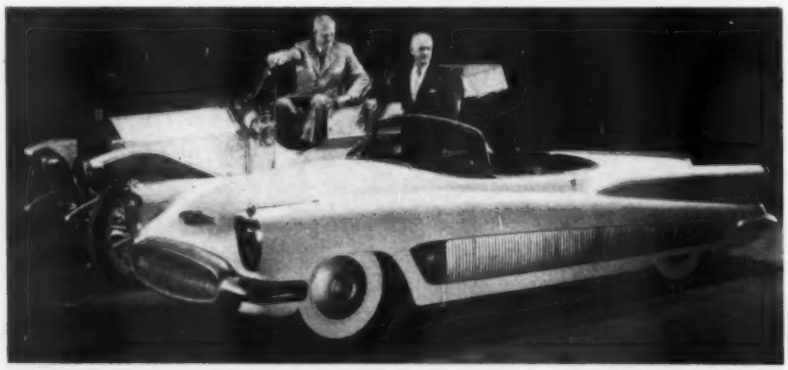
**Statements required.**—To secure an allocation of materials, producers will be asked to submit complete detailed statements of their proposed operations. PAD, however, does not intend to set up any restrictions on producers' activities, although conceivably it might reject an application for material to drill a 10-bbl. well if the material was needed for a 100-bbl. one.

The allocation program, of course, will involve control over inventories and some companies which are known to have large stocks of pipe may be refused additional supplies until their reserve stocks have been reduced. During the war, Petroleum Administration for War had a rule that inventories should be limited to a 60-days' supply, but there is some doubt whether that period can be adopted now in view of the 45-day figure set by the National Production Authority.

**Conversion deals.**—Automobile manufacturers and the NPA are engaged in controversy over so-called conversion deals, in which the manufacturers find steel billets that are available at plants unable to fabricate them and have them turned into sheets at fabricating plants with idle time due to lack of steel. Similar deals have been made by oil producers badly in need of pipe, but there are indications that PAD will not adopt the NPA position that they should be prohibited. Officials in the oil administration take the view that when the steel program gets rolling operators will find it difficult to find either steel or fabricating facilities and conversion operations will die out. On the other hand, they take the position that if an operator is willing to pay the excessive cost of such pipe, it will add to the supply and may find some oil, and oil production is what they are after.

**Materials program.**—A program for materials other than for production is expected to be ready for submission to NPA within a week or so.

PAD officials said last week the supply situation is difficult all along the line and materials are expected to get progressively tighter until a distribution program gets rolling. Once the way is cleared for the allocation of tubular goods and equipment both for production and refining, conditions are expected to improve, but it is pointed out that some weeks will elapse before the necessary procedures can be put into effect.



## Only a Dream

**General Motors Corp. calls this experimental Buick a "dream car," but it would be a nightmare for refiners if put on the market now for it will knock on even the highest-octane gasoline obtainable unless methyl alcohol is injected. Its supercharged, 300-hp., V-8 engine has a compression ratio of 10 to 1, with airplane-type, dual-carburetion system providing automatic injection of methyl alcohol for acceleration. The "XP-300," shown here with a 1910 Buick, contains scores of novel mechanical and design features, but the whole job is experimental. It is a feature of the Chicago Auto Show this week.**

## Tanker Fleet Growing

WASHINGTON. — Eighty-eight per cent of the privately owned tanker fleet has qualified for participation in the voluntary plan for the contribution of tanker capacity for national defense requirements, it was announced last week by Vice. Adm. E. L. Cochrane, head of the Maritime Administration.

Cochrane released a report from William F. Dunning, chairman of the

# WATCHING WASHINGTON

Bertram F. Linz

## Materials Troubles

The materials supply situation appears slated to get considerably worse before it gets better.

For the oil industry, officials in Washington see steadily tightening conditions over the next 3 or 4 months before an allocation system for tubular goods and equipment can be put into effect.

Discussions and actions of the National Production Authority disclose that shortages are extending into new fields all the time. How broad the field has become is evidenced by the necessity to give the Defense Department and some other agencies the right to grant priorities for office equipment and supplies.

If present government planning works out, however, the era of scarcities will be relatively short—far from the decade or more foreseen by administration spokesmen only a few months ago.

Current Washington thinking runs something like this: 1951 and 1952 will see sharp restrictions on civilian consumption of most things not directly necessary to maintenance of the economy but they will be "years of expansion" in which the armed forces will build up a supply of material adequate to support 1 year of war and the productive capacity of the nation will be increased to a point where, while not permitting the lifting of all regulation, controls can be eased in 1953 so that civilians may have a greater share of the things they will soon be asked to forego.

Economic stabilization measures, including price and wage controls, may have to be continued somewhat longer and higher taxes will go on indefinitely because military procurement will continue at a high rate for some years. But once the tooling up for military production on a large scale has been completed, the impact of war orders on materials and facilities will be relatively lighter.

## Tax Prospects

Prospects of further increases in taxes in the near future have dwindled as a result of a decision by the House ways and means committee to review the administration's entire tax program before writing legislation.

An immediate increase of some $10,000,000,000 in taxes to be followed by another increase later in the year of possibly as much as $6,000,000,000 was requested by the President in January, the whole designed to put the defense program on a pay-as-we-go basis. Features of the immediate program sent to Congress were a reduction of the depletion allowance to 15 per cent, modification of the option to expense intangible drilling expenses and a doubling of the tax on gasoline from which about $1,000,000,000, or 10 per cent of the total, would be derived.

The House committee's action was prompted by a statement by Chairman Walter F. George of the Senate finance committee that he would not make a two-bite job of taxes and would defer action on any bill sent over by the House until a measure could be written.

There is a strong and growing demand in Congress for cutting the President's budget, which he has outrightly dared Congress to attempt. While some members believe that only $500,000,000 or so could be trimmed off, others assert that savings of $5,000,000,000 to $7,000,000,000 could be accomplished by economies in government nondefense spending.

## PAD Test

The Petroleum Administration's handling of its program to save tetraethyl lead for stockpiling is providing a good test of the agency's flexibility and ability to adapt its regulations to fit operating conditions in the industry.

PAD's proposal to save lead by placing ceilings on the octane values of gasoline was subjected to attack by a handful of companies at the hearing last month. More recently, the matter has been brought to the attention of Congress by one of the companies fighting the ceiling idea, which has asked the New England delegation to urge Secretary Chapman not to sign any such order.

The major charges against the octane-limitation proposal are that it discriminates against coastal refiners, who use no more lead than many refiners in the interior; penalizes refiners who get high-octane values by means other than TEL, and is in conflict with provisions of the Defense Production Act barring government efforts to standardize products.

In preference to ceilings, opponents of the plan call for an across-the-board cut in the use of lead by refiners which they contend would preserve the competition between refiners and encourage the adoption of methods for getting high-octane values without lead.

tanker-requirements committee, that acceptances have been received from 76 companies representing practically all owners of United States flag tanker tonnage.

Dunning said that 53 per cent of the companies had qualified with tonnage as participants in the plan as of January 1, the participating tonnage consisting of 368 tankers of 5,850,456 dwt. tonnage out of the United States flag total fleet of 424 tankers of 6,647,741 dwt. tonnage and 57 tankers of 1,250,165 dwt. tonnage under foreign registry.

Cochrane explained that tankers not qualifying under the plan consist of vessels under long-term charters to foreigners who could not be participants, a few tankers recently transferred to other owners, domestic or foreign, and tankers in Great Lakes service or specially fitted for the carriage of other than petroleum products.

# NPC Committee

## Group to cite requirements to step up oil production

WASHINGTON. — Continuance of present tax provisions permitting percentage depletion and expensing of intangible drilling expenditures and quick settlement of the dispute over management of the tidelands oil areas will be cited as major requirements in any program to increase Western Hemisphere productive capacity by 1,000,000 bbl. daily in the report to be made for the Petroleum Administration by the National Petroleum Council committee headed by Dr. Robert E. Wilson, chairman of the board of Standard Oil Co. (Ind.).

That these two factors will be emphasized was made clear last week by Wilson in announcing that the committee had held its initial meeting in New York and had appointed subcommittees to go into various phases of the capital and materials requirements for expansion of production.

**Cites responsibilities.**—"If the petroleum industry is to meet anything like 1,000,000 bbl. daily expansion to assure national security, the climate within which this industry has heretofore met its great responsibilities to the Government and the public must be maintained," Wilson asserted in refering to the tax and tidelands questions.

It was also pointed out that expansion of productive capacity will involve expansion also of storage, refining, and transportation facilities, the first being particularly of importance in view of the committee's finding that to maintain even the recent high levels of refinery operation on a year-round basis will require a

major increase in storage capacity to take care of seasonal accumulations of heating oils.

**Work divided.**—At its initial meeting the committee divided its work among four subcommittees, a production subcommittee headed by L. F. McCollum, president of Continental Oil Co., Houston; refining subcommittee under Eugene Holman, president of Standard Oil Co., (N.J.), New York; transportation subcommittee under P. C. Spencer, president of the Sinclair Oil Corp., New York; and storage-capacity subcommittee headed by L. S. Wescoat, president of Pure Oil Co., Chicago.

# Price Regulation

## Orders controlling oil being worked up by OPS

WASHINGTON.—Specific orders for the regulation of oil-industry prices from the well to the retailer are being worked up in the Office of Price Stabilization and representatives of the industry are expected to be called in for consultation in the near future, with a possibility that the regulations may come out next month.

Separate regulations are under consideration for crude oil; asphalt and asphalt products; lubricating oils and greases and industrial oils; sales by jobbers and wholesalers; and sales at retail.

**Formula.**—With the exception of crude oil, on which specific ceilings may be fixed, the regulations are expected to require the figuring of prices by a formula relating to a base period, which may be the December 19-January 25 period established by the OPS general price regulation issued last month, or a different period selected by OPS as more representative for the oil industry.

Before the orders are issued, industry-advisory committees will be appointed for the segments of the industry affected and called in for consultation.

**Steel discussions.**—Meanwhile, the National Production Authority is continuing its discussions of steel and other supplies with representatives of various industries and is also pushing the drafting of a controlled-materials plan. The CMP orginally was expected to come during the summer but the steadily tightening supply situation may necessitate the speeding up of plans for complete allocation of steel and other metals which are in short supply.

Formal actions by NPA during the past week included the following:

**Amendments to various delegations,** February 12: Providing priorities for the procurement of commercial office equipment and supplies by the Defense Department and other specified agencies.

**Delegation 8,** February 12: Providing priority ratings for materials to maintain and expand the State Department's Voice of America program.

**Order M-37,** February 14: Limiting zinc-scrap inventories and regulating scrap toll agreements.

**Supplement 4 to Order M-1,** February 16: Directing the provision of approximately 9,000 tons of steel products monthly, April through June, for the repair and conversion of seagoing vessels in domestic shipyards.

**Order M-38,** February 16: Limiting inventories of lead and lead-bearing materials to a 60-day supply or a practical minimum working supply, whichever is less.

**Order M-39,** February 16: Limiting inventories of antimony and antimony-bearing materials to a 60-day supply or practical minimum working supply, whichever is less.

# Octane Cut Canceled

## PAD substitutes plan for TEL allocation to dealers

WASHINGTON.—An order calling for rationing of tetraethyl lead rather than octane ceilings on gasoline will shortly be issued by the Petroleum Administration for Defense, it was disclosed this week in telegrams sent to refiners by Deputy Administrator Bruce K. Brown.

Brown warned, however, that while lead allocation will meet the present need "further mobilization may later necessitate octane ceilings."

Designed to reduce the consumption of lead in order that a stockpile can be built up, the order will restrict all refiners to the use of a base allotment of 1,000,000 lb. annually of TEL fluid or their actual 1950 use, whichever is the lesser, plus 80 per cent of the quantity obtained by subtracting the refiner's base allotment from the amount of fluid used by him in 1950.

Adequate provision is expected to be made for any hardship cases that may develop, the details of which have not been perfected.

**Protests.**—The switch in PAD plans from octane ceilings to an across-the-board cut came partly as a result of protests against the former at an industry meeting in Washington last month, but Brown said, "The radical change in the basic situation caused by recently increased requirements for aviation gasoline which will require some refiners to divert high-octane components from automotive gasolines," has been an even more important factor.

**Firms object.**—A number of oil companies, outspoken of which were Sun Oil Co. and Standard Oil Co. (Ohio), had objected strenuously to the establishment of proposed ceilings of 90 octane for premium-grade, 86 for intermediate, and 84 for regular-grade gasoline. These ceilings had been proposed by Bruce K. Brown, deputy administrator, when the agency first announced its octane-cut plan *(The Oil and Gas Journal, January 18, 1951, page 31, February 1, 1951, page 29, and February 8, 1951, page 56).*

## PAD, Gas Officials Meet

WASHINGTON.—Representatives of the gas industry held another meeting with Secretary Oscar L. Chapman and Deputy Petroleum Administrator Bruce K. Brown, February 20, to discuss the formation of a gas division in PAD and a cooperating organization patterned along the lines of the National Petroleum Council.

The industry group was asked to make recommendations for the top posts in the gas division, now held temporarily by R. H. Hargrove, of Shreveport, as acting assistant deputy, and N. W. Freeman, of Houston, as acting director.

Chapman also asked for advice regarding the nature of the gas-industry advisory council and the establishment of district or regional committees similar to those which he said are to be set up for the oil industry. Just how independent the oil and gas councils are to be remains to be decided, since the Department of Justice has not yet acted on Chapman's recommendation that the NPC remain under the chairmanship of an industry man instead of being headed by a full-time government official as is required for committees set up by the National Production Authority, Office of Price Stabilization, and other defense agencies.

## Concession Study Sought

WASHINGTON.—Investigation by the Senate foreign relations committee of the rights and concessions secured by American oil companies from foreign governments has been proposed by Sen. William Langer of North Dakota.

Langer's measure (S. Res. 21) was one of three pieces of oil legislation introduced in which House and Senate met a couple of times but did not attempt to transact any business.

In the House, Rep. Clifford Davis of Tennessee introduced H.R. 1177, a bill to impose income taxes on cooperative corporations, and Rep. Edwin E. Willis of Louisiana added H.R. 1230 to the growing list of bills to restore title to the tidelands to the states.

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# Texas Allowable Up

## 2,800,742-bbl. daily figure for March, representing 23 producing days, makes it highest since September 1950

Carl Hoot

FORT WORTH.—Buyer requests for additional crude oil, presented before the Texas Railroad Commission state-wide hearing, brought about an increase in the daily allowable production for March.

The new figure of 2,800,742 bbl. daily represents 23 producing days generally for the state's prorated areas. East Texas was assigned 19 producing days for March; the Fullerton field was given 19 producing days, Willamar field 12, and Pantex field 14 days.

**Highest since September.**—Daily production in March will be 71,554 bbl. more than the daily rate as of February 10, and the highest since September 1950 when the all-time high of 2,886,458 bbl. daily was set.

Total liquid hydrocarbon production for the state will be 3,152,836 bbl. daily, including an estimated 352,094 bbl. of distillate and natural gasoline.

Purchaser nominations totaled 2,796,431 bbl. daily for March, compared with 7,732,690 bbl. daily in February.

**B. M. estimate.**—The Bureau of Mines' estimated demand for March was 2,460,000 bbl. daily. The bureau's figure, however, is usually smaller than the new allowable.

Commissioner Olin Culberson warned too heavy production at this time would mean trouble ahead, and expressed doubt that foreign-oil imports, plus the winter heating-oil demand, would hold much longer.

Company representatives generally agreed on the new 23-day pattern, although a few asked for 24 days. Included in the latter group were Sun Oil Co., Sinclair Oil & Gas Co., Stanolind Oil Purchasing Co., Humble Oil & Refining Co., and Gulf Oil Corp.

J. A. Neath, Humble vice president, said that his company would be short 41,000 bbl. daily under the new 23-day order. Ralph Dietler, of Stanoland, also agreed with Neath and said that market demand is beyond all expectations and will stay high for another 3 or 4 months.

**To reopen plant.**—E. W. Neason, representing Petrol Refining, Inc.'s Texas City refinery, said their plant would be reopened March 1 after a 15-month shutdown. Neason said the firm would need from 25,000-30,000 bbl. of crude daily to fill aviation-gasoline contracts.

**MARCH ALLOWABLE**
(By Commission Districts)

| | March | Increase |
|---|---|---|
| Dist. 1 (Southwest) | 35,652 | 481 |
| Dist. 2 (Southwest) | 163,644 | 5,526 |
| Dist. 3 (Gulf Coast) | 499,383 | 12,714 |
| Dist. 4 (Southwest) | 259,654 | 6,997 |
| Dist. 5 (East Central) | 50,715 | 1,640 |
| Dist. 6 (Outside E. T.) | 114,938 | 3,485 |
| Dist. 6 (E. T. field) | 271,364 | 2,405 |
| Dist. 7-B (West Central) | 92,896 | 2,026 |
| Dist. 7-C (West Central) | 85,818 | 2,265 |
| Dist. 8 (West Texas) | 944,869 | 30,695 |
| Dist. 9 (North Texas) | 178,292 | 3,316 |
| Dist. 10 (Panhandle) | 103,517 | 4 |
| Total | 2,800,742 | 71,554 |

H. S. Lane, Crown Central Petroleum Corp., said it could use an additional 4,000 bbl. of crude daily.

L. N. Dunn of Waco, purchaser and trucker, was seeking an outlet for 300-500 bbl. of crude daily in Falls County.

**Emergency order.**—The Commission also issued an emergency order, effective February 15, directed toward eliminating unnecessary drilling. The order permits only one well to be drilled on the maximum proration unit in a field where the allocation formula is based on 50 per cent on acreage and 50 per cent per well. This would affect areas where spacing rules might indicate one or more wells could be drilled on the proration unit. The order was to stand as permanent if there were no present national emergency.

**Ratio surveys.**—Also considered was the order which requires two gas-oil ratio surveys per year. Commissioner William J. Murray said the order might be withdrawn due to the manpower situation, but warned that pipe-line connections would be severed on leases if errors were found in the annual survey.

**NOMINATIONS, BY DISTRICTS**

| | March | Change |
|---|---|---|
| Dist. 1 (Southwest) | 34,116 | — 40 |
| Dist. 2 (Southwest) | 168,932 | + 3,267 |
| Dist. 3 (Gulf Coast) | 492,466 | +10,413 |
| Dist. 4 (Southwest) | 250,245 | + 6,914 |
| Dist. 5 (East Central) | 57,203 | + 803 |
| Dist. 6 (Outside E. T.) | 105,607 | + 4,275 |
| Dist. 6 (E. T. field) | 323,138 | —11,168 |
| Dist. 7-B (West Central) | 85,881 | + 3,878 |
| Dist. 7-C (West Central) | 83,752 | + 4,799 |
| Dist. 8 (West Texas) | 917,152 | +39,841 |
| Dist. 9 (North Texas) | 174,454 | + 1,527 |
| Dist. 10 (Panhandle) | 103,485 | — 768 |
| Total | 2,796,431 | +63,741 |

Ira Butler, Texas Pacific Coal & Oil Co., told the commission that recent surveys by the North Basin Pools Engineering Committee indicated available manpower from Texas schools would be 30 per cent less than last year, and that armed forces would take 50 per cent of available engineering graduates.

The next state-wide proration hearing was set for March 15, at the Commodore Perry Hotel in Austin.

## Gas Bills Set for Hearing

AUSTIN.—Two bills to fix prices paid to natural-gas producers have been set for hearing by a legislative committee February 28.

Rep. John L. Crosthwait, Dallas, said the House committee on oil, gas, and mining, will hold hearings on bills by R. E. Blount of Big Spring, and John E. Morrison, Jr., of Chillicothe. Each bill prescribes a 10-cent minimum per 1,000 cu. ft. of gas at the well head. *(The Oil and Gas Journal, February 15, 1951, page 59).*

The House committee also will review Morrison's bill ordering the Texas Railroad Commission to prorate gas on a state-wide basis as it now does oil.

Crosthwait set for hearing on February 21 a bill to require labeling of containers for "drip" gasoline offered for sale as motor fuel, and to make oil operators post public notice of royalty owners whom they cannot locate for payment.

The Railroad Commission on March 9 will hear arguments on the question of whether or not it has legal authority now to fix gas prices.

## DeGolyer Sells Atlatl Stock

DALLAS.—E. L. DeGolyer, of the geological consulting firm of DeGolyer & MacNaughton, has sold the stock of Atlatl Royalty Co. to a group of New York investors including the firms of J. H. Whitney & Co. and White Weld & Co.

DeGolyer personally owned all stock in Atlatl, one of the Southwest's biggest royalty concerns. He had been president and treasurer of the firm, with Mrs. Nell DeGolyer secretary and J. S. Michel vice president. The transaction does not involve the firm of DeGolyer & MacNaughton.

Ownership of Atlatl was passed to San Jacinto Petroleum Corp., formed by the purchasers. B. C. Schmidt, New York, partner in J. H. Whitney & Co., is president of the new San Jacinto organization.

San Jacinto will maintain offices in the Reserve Loan Life Building, Dallas, with George A. Works, Jr., in charge.

Properties held by Atlatl are in the Gulf Coast area. The company also had considerable royalty holdings in Texas and Louisiana as well as undeveloped acreage. Producing properties included both oil and gas wells.



XUM

# "Poor-Boy" Pool

## Quick-payout record probably being established by oil operators in shallow Willow Springs field of California

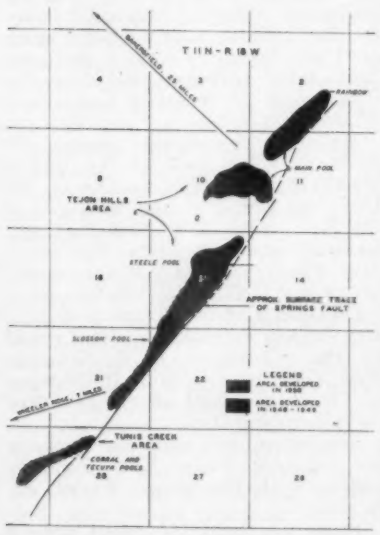
D. H. Stormont

BAKERSFIELD.—Some sort of a modern record for quick payout probably is being established by oil producers in Willow Springs field about 25 miles southeast of here, on the southeastern edge of the San Joaquin Valley.

Flush production is being obtained from depths as shallow as 450 ft., and many of these producers come in with initial potentials of 75 to 100 bbl. daily. Some, after producing for 1 year, still are pumping as much as 60 bbl. daily, and the crude is high gravity, by California standards, ranging from about 28° to 34°.

**Quick completion.**—Using light, shop-made rotaries, the shallower wells are spudded and completed in about 6 days. Total cost, including the setting of a pumping unit, is only about $6,000. Thus with 30°-gravity crude bringing $2.47 per barrel, some wells have paid out in less than 60 days. One two-well lease is said to have made its owner almost $100,000 last year.

The field's discovery was a 385-ft., 45-bbl. producer completed in July 1948. This well opened production from the Santa Margarita zone in what is now called the Main pool of the Tejon Hills area, Willow Springs field. Subsequent development has added the Steele, Rainbow, and Slosson pools in the Tejon Hills area and Corral and Tecuya pools in the Tunis Creek area (see map). Current production from this group of pools is about 3,000 bbl. daily.




*Oil production at this string of pools ranges from around 400 to 1,700 ft. Numerous cross faults exist but production may be practically continuous along the west side of the Springs fault by the time development is completed.*

**Eighty producers.**—In Tejon Hills pools about 80 producers have been completed in the Santa Margarita sand at depth of 400 to 600 ft. The Tunis Creek area, a last year's development, in addition to this sand has two deeper pays. These are the 1,200-ft. Olcese sand (tentative) of Corral pool and the 1,600-ft. Tecuya pay. Of the 11 wells completed at Tunis Creek, 1 is in the Santa Margarita, 3 produce from the 1,200-ft. pay, and 7 are in the Tecuya pay.

Production of the Santa Margarita, which is a coarse-grained, friable sand averaging about 40 ft. in net thickness, apparently is controlled by the Springs fault. It is believed to limit production along the southeast flank of these westerly dipping sands. Numerous dry holes inside proven limits, as well as topographic and water-table data, indicate the presence of several crossfaults.

**Steele pool.**—In Steele pool operators have moved out several locations from the Springs fault, the surface trace of which is shown by a line of springs. On the southwest end, in Slosson pool, drilling has been kept fairly close to the fault. In fact development there is more or less just a single row of wells for about 1 mile in extent. Just how far Santa Margarita production will extend downdip in this area, as well as the final limits of the northeastern pools, is yet to be determined by the drill.

Because of the few wells completed in the deeper pays, and the fact that most exploratory wells in the area were not carried deep enough to test these zones, extent of this production is likewise yet to be determined. As the 1,200-ft. sands appear to pinch out on the northeast and southeast, some geologists familiar with the area believe this production is due to a stratigraphic trap possibly involving the Springs fault. Production from the nonmarine Tecuya beds appears to be controlled by a marked angular unconformity.

**Potentials.**—Of the seven wells completed in the Tecuya zone, three had initial potentials in excess of 200 bbl. daily. Two wells, the pool opener and one completed last month, flowed more than 300 bbl. daily.

*The 500-ft. wells, drilled with light rigs of this type, are completed in from 5 to 7 days.*

Bulk of production in Willow Springs field is owned by independents. Steele Petroleum Co. and Tejon Hills Co., each with about 20 producers, are the largest producers. O. M. Slosson of Long Beach has 13 producers, and D. K. Associates of Los Angeles has 8. Standard Oil Co. of California and Richfield Oil Corp. are the only major companies owning production there.

## Eagle Acquired by Sunset

LOS ANGELES.—Negotiations have been completed covering transfer of operations and operating assets of Eagle Oil & Refining Co., Inc., to Sunset Oil Co., in exchange for Sunset common stock. As a result, Eagle now owns controlling interest in Sunset, and operations of the two companies under the name of Sunset Oil will be handled by J. D. Sterling, president, Morton A. Sterling and Harvey F. Nelson, vice presidents, and Milton L. Friedman, secretary-treasurer.

Included in the approximately $10,000,000 in operating assets now held by Sunset are 700 service stations on the West Coast, two refineries (one, operated by Eagle at Santa Fe Springs, Calif., is now shut down; the other, Sunset's Torrance, Calif., plant, has capacity of 8,500 bbl. daily) and an extensive pipe-line network.

# New Refining Process

## Atlantic Refining introduces method which promises high octane yield, conservation of crude, versatile operation

George Weber

PHILADELPHIA. — An important contribution to petroleum technology in the form of a new catalyst reforming process has been announced by Atlantic Refining Co. The process results from over 4 years of concentrated effort in the refining-division laboratories of the company's research and development department here.

Improved motor-fuel quality, greater conservation of crude resources, and alternate application to aromatics production are the leading benefits attributed to commercial application of this process by its developers. The Atlantic process promises a new degree of flexibility and shows an impressive yield and octane performance on the basis of pilot-plant operations. The first commercial application will be a unit now building at the company's Philadelphia refinery. Scheduled for initial operation early next year, the new unit will have a capacity for processing 11,000 bbl. of naphtha charge daily.

**Process features.** — The process will employ a preheat furnace, two or more reactors and facilities for reheating the hydrocarbon stream between reactors. Reformate from the final reactor in the series, after preheating naphtha charge, is further cooled and passes to a separator vessel. Condensed liquids, comprising propane and heavier, are withdrawn as stabilizer charge. Stripped of propane and butanes, the stabilized reformate is ready for blending without further treating. Separator gas, composed normally of 97 to 98 per cent hydrogen, is compressed and recycled with fresh naphtha charge in the ratio of 10 volumes of hydrogen to 1 volume of hydrocarbon vapor. Excess hydrogen plus small amounts of methan, ethane, and in some cases hydrogen sulfide, is withdrawn from the system as fuel.

**Platinum catalyst.**—The reactors hold fixed beds of small pellets containing platinum as the active catalytic agent. This catalyst is a new development, Atlantic representatives report, which provides the proper control of hydrocarbon reactions to maximize isomerization and dehydrogenation and minimize undesirable cracking.

The new Atlantic process differs from others in providing for the periodic regeneration of catalyst in place and when necessary, without interruption of over-all plant operation. When carbon deposition on catalyst has caused activity to decline to an undesirable point, the reactor is bypassed, and conditions in the remaining on-stream reactor or reactors are adjusted to compensate for the off-stream vessel.

**Turnaround.** — Regeneration takes place at process pressure, expediting turnaround. The circulating stream comprises less than 1 per cent of oxygen in an inert gas, and complete carbon burnoff proceeds smoothly at temperatures controlled between 950° and 975° F. It is estimated that the catalyst bed in a reactor of commercial size can be regenerated in about 8 hours, and a complete turnaround can be made in less than 24 hours.

Frequency of regeneration will be governed by the severity of operation which determines rate of coke deposition. Under normal conditions, reforming average naphtha for octane improvement, the process is essentially nonregenerative in nature and runs of indefinite length may be anticipated.

**Regeneration.**—In certain cases where severe operating conditions are desired, to process a stock of higher-than-normal gasoline end point or to obtain certain end products, the hydrogen atmosphere will not totally suppress carbon deposition on the catalyst. Under these anticipated conditions, it is estimated that regeneration may be required on the average of once in 6 weeks. The process provides the flexibility for severe catalytic reforming without requiring the excess capacity demanded in regular cyclic regeneration. The regeneration facilities are expected to represent about 10 per cent of unit installation cost.

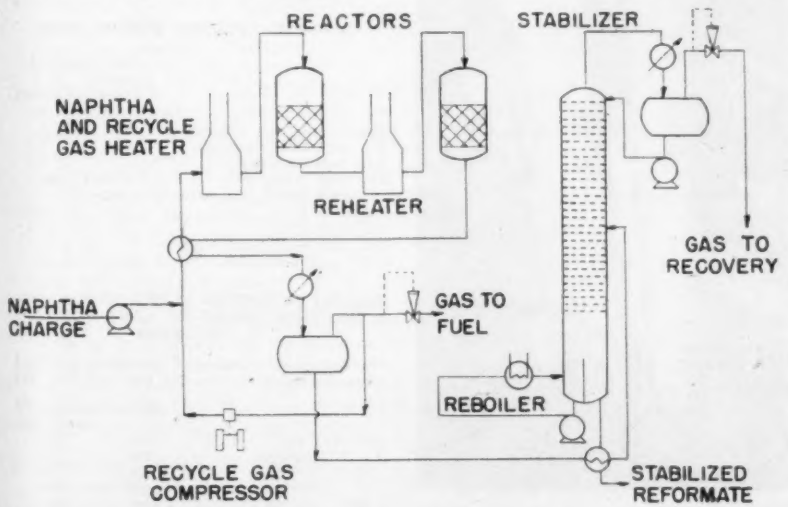
Because of the possibility of catalyst regeneration, the process requires no prefractionator as a precaution against the charging of high-boiling hydrocarbons.

**Octane improvement.** — The process was developed to meet the growing need for upgrading low-octane naphthas to produce high-quality gasoline-blending stocks. Charge stocks may include any fractions of crude naphtha up through normal gasoline end point,, natural gasolines, and mildly thermally cracked naphthas. Neither sulfur nor normal water concentrations in fresh feed will contaminate the catalyst.

Vaporized feed from the preheat furnace contacts the catalyst at temperatures ranging from 850° to 1,000° F., depending on the characteristics of the stock and the degree of required conversion. Reactor operating pressures will range from 300 to 700 psig., averaging 500 psig. for normal naphtha reforming. Reheat between reactors is necessary to compensate for the endothermic heat of reaction.

Yield and quality data for motor-fuel production from East Texas crude naphtha, a typical reformer stock, is presented in Table 1. The increasing severity from left to right, effected by higher reactor temperatures, is reflected in product quality and yield.

**Aromatics production.**—Development of the process predated the Korean War, when the principal aim was to upgrade straight-run gasoline fractions in order to compete more suc-




*Simplified schematic flow chart for the Atlantic Catalytic Reforming Process. Regeneration facilities which are a feature of this process, are not depicted.*



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cessfully in the brisk octane race of that period. The present mobilization requirements for aromatics, superimposed on a basic benzene shortage, now focus attention on an alternate use for the Atlantic process. The isomerization and dehydrogenation of naphthenes to aromatics. Atlantic reports the ability to obtain 88 per cent conversion of naphthenes to benzene without recycling.

**Benzene output.**—The production of benzene by a once-through operation on a $C_6$ straight-run fraction is shown in Table 2. This reveals a conversion of nearly 85 per cent of naphthenes. It should be particularly noted that extensive isomerization of the $C_6$ rings is necessary to make this result possible. That in turn requires much more severe conditions of operation than the normal reforming of naphtha. While the operation for Table 1 proceeded at a weight-space velocity of 4.8, the space velocity in this benzene operation was 2.4 and temperatures were higher. Table 3 depicts a once-through operation on a $C_7$ fraction from crude naphtha for production of toluene, which shows about 95 per cent conversion of cycloparaffins.

**TABLE 1—MOTOR GASOLINE PRODUCTION—EAST TEXAS NAPHTHA**

| | Charge | Products 1 | 2 | 3 |
|---|---|---|---|---|
| A. P. I. gravity | 55.9 | 52.1 | 51.7 | 50.7 |
| R. V. P. | 1.0 | 2.6 | 2.7 | 3.7 |
| A.S.T.M. dist. 0 | 188 | 142 | 134 | 122 |
| 10 | 215 | 194 | 192 | 177 |
| 50 | 257 | 254 | 250 | 243 |
| EP | 373 | 382 | 370 | 385 |
| C.F.R.R. octane 0 cc | 54.5 | 73.6 | 79.8 | 85.0 |
| 3 cc | 74.3 | 90.8 | 93.7 | 96.3 |
| Yields, % of F.F.— | | | | |
| Vol. % $C_5$ plus | ... | 93.5 | 90.7 | 88.6 |
| Wt. % $H_2$ | ... | 1.37 | 1.49 | 1.75 |
| $C_1$ | ... | .07 | .10 | .19 |
| $C_2$ | ... | .12 | .27 | .45 |
| $C_3$ | ... | 1.18 | 1.96 | 2.75 |
| Vol. % $C_4$ | ... | 2.28 | 4.27 | 5.39 |

**Aviation blend.**—The production of aviation blend stock from an East Texas $C_6$ fraction is presented in Table 4. This demonstrates that a combination of catalytic reforming and fractional distillation will produce a substantial yield of high-octane blend stock.

**Catalytic reactions.**—Isomerization and dehydrogenation are the two desirable reactions which are promoted by balance achieved in catalyst properties and operating conditions. Undesired cracking, on the other hand, is suppressed to a minimum. Isomerization upgrades straight-chain paraffins to higher-octane isoparaffins and converts cyclopentanes to cyclohexanes. The cyclohexanes in turn are readily dehydrogenated to benzene and other aromatics.

What little cracking takes place occurs near the center of the paraffin molecule, resulting in extremely low production of light ends. In mild catalytic reforming of naphtha, methane and ethane production can be held to 0.2 per cent by weight of fresh charge. In pilot-plant operations, over 60 per cent of butanes produced by cracking are in the form of isobutane. Undesirable sulfur compounds in feed stocks are almost completely removed with excess gas, as hydrogen sulfide.

*In charge of the research program which resulted in the new process were Hugh M. Field, Atlantic vice president and general manager of the research and development department, and Merrill J. Fowle, director of the refining division in the department. Here they examine a sample of the new catalyst developed in the Philadelphia laboratories.*

**Worked 4 years.**—The new Atlantic process results from 4 years of work conducted at the company's research and development laboratories at Philadelphia. The process was perfected after extensive evaluation of catalysts in four laboratory units, each capable of processing 1 gal. every 36 hours. During the later development period,

*This pilot plant, placed on stream last July, has produced over 50,000 gal. of reformate by the new process.*

**TABLE 2—BENZENE PRODUCTION**

| | Charge stock | Product |
|---|---|---|
| Per cent paraffins | 36.2 | 32.7 |
| Per cent cyclopentanes | 26.5 | 6.8 |
| Per cent cyclohexane | 29.6 | 0.8 |
| Per cent benzene | 7.4 | 45.8 |
| Per cent toluene | 0.3 | 4.9 |
| Per cent $C_5$ | ... | 2.9 |
| Per cent $C_4$ | ... | 6.1 |
| Boiling range (T.B.P.), °F. | 160-185 | ... |
| Vol. per cent F.F. ($C_4$ and heavier) | 100 | 85.5 |

**TABLE 3—TOLUENE PRODUCTION**

| | Vol., per cent— Charge stock | Product |
|---|---|---|
| Per cent paraffins | 35.0 | 19.0 |
| Per cent cyclopentanes | 26.2 | 2.1 |
| Per cent cyclohexanes | 28.3 | 0.8 |
| Per cent benzene | ... | 2.4 |
| Per cent toluene | 10.2 | 46.6 |
| Per cent other aromatics | 0.3 | 7.1 |
| Per cent $C_5$'s | ... | 2.2 |
| Per cent $C_4$'s | ... | 19.8 |
| Vol. per cent fresh feed ($C_4$ and heavier) | 100.0 | 89.1 |

**TABLE 4—AVIATION BLEND STOCK PRODUCTION CHARGING EAST TEXAS $C_6$ FRACTION**

Ttl. reformate yield—Vol. per cent chg. 84.1
Aromatic blend stock—Vol. per cent chg. 30.4

| | stock | blend stock Aromatic |
|---|---|---|
| Gravity, A.P.I. | 55.6 | 33.0 |
| A.S.T.M. dist. 0 | 246 | 278 |
| 10 | 250 | 280 |
| 50 | 255 | 281 |
| 90 | 263 | 283 |
| EP | 295 | 316 |
| Octane 1-C at 4.6 cc TEL | .. | 104-106 |
| 3-C at 4.6 cc TEL | ... | 212 P.N. |

which began last July, the pilot plant has processed over 50,000 gal. of raw charge per day, producing over 50,000 gal. of high-quality reformate.

**Costs not revealed.**—Estimates on installation cost, operating costs, and catalyst life are not revealed publicly at this time. Commercial operation of the first unit will be required to determine eventual catalyst cost per barrel of fresh charge. Since declining catalyst activity due to carbon deposition may be restored by regeneration and since the catalyst is not contaminated by sulfur or moisture, a long catalyst life may be anticipated.

**Catalyst.**—The new catalyst, developed by Atlantic, will be commercially manufactured by Davison Chemical Co., of Baltimore. A single charge for Atlantic's three-reactor, 11,000-bbl. per day unit will require about 25 tons.

The new process is made available to the industry through license arrangements on a conventional royalty basis. Atlantic reports several major refiners as seriously considering adoption of the new process.

# Gas-Injection Method

## Atlantic Refining says its new method for increasing recovery of oil from underground reservoirs successful

PHILADELPHIA.—Atlantic Refining Co. revealed last week that its new high-pressure gas-injection method for increasing recovery of oil from underground reservoirs proved completely successful in limited field applications, and that a full-scale operation will be undertaken as rapidly as possible.

During the past year, engineers of the company's research and development department have operated a pilot test of the new technique, in Block 31 field of Crane County, West Texas.

Although high-pressure gas injection in this test project was not undertaken at the pressures and volumes proposed for full-scale application of the new principle, the company reports that the tests demonstrate conclusively that the technique is feasible. Accordingly, a high-pressure recovery operation will be instituted in Block 31 field as rapidly as possible.

**Method.**—The new Atlantic method, first announced a year ago, *(The Oil and Gas Journal, February 2, 1950, page 31)* involves the injection of natural gas to an oil-bearing reservoir at higher pressures than have ever before been used in pressure maintenance or recycling.

Scientists working at Atlantic's production-research laboratory in Dallas have discovered that crude oil and hydrocarbon-gas mixtures, when under high pressures, possess properties previously unknown. With this knowledge, they developed an operating technique on laboratory scale, that showed indications of proving practicable in the recovery of nearly all oil from a reservoir. The field tests conducted during the past year have borne out the laboratory findings.

**Recovery.**—Hugh W. Field, Atlantic vice president and manager of the research and development department, stated that the company estimates that application of this method will result in boosting recoverable reserves in Block 31 field 10,000,000 bbl. Block 31, developed shortly after World War II, had produced 8,605,000 bbl. by January 1 and has estimated recoverable reserves exceeding 36,000,000 bbl. by conventional-recovery methods. The field has 77 producing wells. Injection tests were carried out in the Devonian pay, which shows an average producing pay thickness of 175 ft. and is the principal pay in the field. The Devonian is topped at about 8,870 ft.

**Full operation.**—Atlantic spokesmen could not say when the injection plant at Block 31 would be completed and the full program begun, but it is possible that the project may get under way later this year. The plant will require sizable compressor capacity to attain the required pressures in the reservoir. Just what pressures will be employed are not yet revealed, but they will in all probability exceed original reservoir pressures. Atlantic engineers estimate that recovery costs for this recovery method will probably range from $1 to $3 per barrel. The new technique promises to recover as much as 90 per cent of original oil in place, as compared with 45 per cent of original oil, left unrecoverable in some fields.

# CANADA

## Ontario Activity

### Union Gas, other firms are active in province

CHATHAM, Ont.—A review of drilling operations in southwestern Ontaria during 1950 by Union Gas Co. of Canada, Ltd., has disclosed that the firm brought in 14 successful gas wells, and drilled an equal number of dry holes.

The company has been active in Canden Gore, Zone, and Oxford in Kent County; Mosa, in Middlesex County; Aldborough and Dunwich in Elgin County; and Dawn in Lambton County. In addition to cable-tool drilling for gas, the company drilled 16 diamond-drill exploratory tests in widely separated townships, including Lobo, Adelaide, Caradoc, and Metcalfe, all in Middlesex County; and Dawn and Sombra in Lambton County.

Union Gas in 1950 embarked for the first time on a program of gravity-meter geophysical work in its search for suitable formations, surveying more than 40,000 acres, and these findings will be tested this year. The firm has spent more than $4,700,000 during the last 15 years in exploring for, and developing gas reserves in the southwestern part of this province, and is now operating in excess of 300 gas wells in eight different fields in Kent, Lambton, and Elgin counties.

**Other companies.**—In the Bay area of northern Ontaria, exploratory tests carried out in recent years by the provincial mines department are to be followed this year by private development of potential oil and gas acreage. Canus Petroleum Corp., of Toronto, has secured from Walter Parry of Dewson Mines, Ltd., drilling rights on one-third of his holdings of 181,440 acres in Rapley, Lambert, Hogg, and the north half of Hecla townships, the Canus holdings being checkerboarded over the entire area, with drilling to start this spring.

Dewson Mines has already done some diamond drilling along the Mattagami River which traverses the holdings, its operations having been under supervision of Dr. T. A. Link, consulting geologist, with E. K. Fockler, of Toronto, as company geologist and William Gerrie as resident geologist.

Canus Petroleum will diamond drill another hole near the Mattagami and continue operations north and northwest into the Moose River Basin, to determine the source of oil met in the Dewson test. Locations for the tests have already been made by Dr. Link and his associate geologists. Production is anticipated from formations of Paleozoic are at Comparatively shallow depth.

## Crude-Oil Line Proposed

OTTAWA.—The Canadian Senate has heard a second reading of a bill to incorporate a new pipe-line company to move oil from Alberta's

Drumheller fields to serve cities in eastern Canada.

Sen. Paul Bouffard of Quebec, explaining the measure for incorporation of Trans-Canada Pipe Lines Co., Ltd., said the firm plans a 2,200-mile pipe line east to serve the main cities on Canadian Pacific and Canadian National Railway lines. These would include Ottawa, Toronto, Montreal, and Hull. The project would cost some $250,000,000, he estimated.

### Decision on Line Postponed

The request of a congressman from Washington State for certification of the need for a natural-gas pipe line from Alberta to the Pacific Northwest is being withheld pending completion of studies by the Petroleum Administration for Defense as to the relative need of lines by various areas of the country.

Rep. H. P. Mitchell had requested United States Defense Mobilizer Charles E. Wilson to declare importation of gas from Canada to the Pacific Northwest vital to the security and defense of the continent *(The Oil and Gas Journal, February 15, 1951, page 62)*.

Mitchell said that the decision will remain "up in the air" for at least 2 or 3 months. Also being considered, he said, is the possibility of substituting an oil pipe line for the proposed natural-gas line.

### Registration O.K. Sought

WASHINGTON. — The Securities and Exchange Commission last week was asked to approve the registration by Prospect Exploration, Ltd., Calgary, Alta., of 170,000 common shares of $1 par value of which 75,000 shares will be sold by the company and the remaining 95,000 will be sold to underwriters at $10 per share for resale to the public at $11.

Prospect Exploration was organized May 13 as a private company "for the purpose of exploring for, acquiring interests in, and developing prospective oil lands in eastern Canada," but in order to sell its stock publicly will amend its articles of association and change its name to Canadian Prospect, Ltd., the registration statement showed.

The company also proposes to change its authorized capitalization from 315,000 shares of no par value to 400,000 shares of $1 par value, part of which will be used to take up by exchange the 190,000 shares of no par stock now outstanding.

Proceeds of the company's sale of the 75,000 shares, less expenses and payments to Wilbur L. Griffith, president and general manager, of the estimated maximum amount which may be payable to him under an agreement, will be placed in the company's general funds.

## MID-CONTINENT

## Crosbie Firm Sold

### Tulsan buys stock, sells properties to Kerr-McGee

PURCHASE of all outstanding stock in J. E. Crosbie, Inc., by William J. Sherry, Tulsa geologist and independent oil operator, for a consideration in excess of $5,000,000, was disclosed in Tulsa last week.

Sherry, in turn, has sold most of the physical properties of the firm to Kerr-McGee Oil Industries, Inc., Oklahoma City drilling contractors. He has retained all stock, however, as well as some of the undeveloped leases and royalty interests of the Crosbie company, and will continue operating these interests under the Crosbie name.

**One of oldest.**—The Crosbie firm is one of the oldest independent oil companies and is the successor company to enterprises started by the late J. E. Crosbie when he moved to Tulsa in 1906. Prior to that time he had been engaged in oil production and drilling in Canada, Sumatra, and South Texas near the Spindletop discovery well. Since Crosbie's death in 1933, the corporation operated with W. B. Moran as president.

At the time of the stock acquisition and sale of physical assets by Sherry, the Crosbie firm had oil production in Oklahoma, Texas, Arkansas, Kansas, and Indiana, as well as interests in four natural-gasoline plants. It also operated two strings of rotary tools in Oklahoma. These properties were acquired by Kerr-McGee from Sherry last week.

The Crosbie company produced 1,800 net barrels of oil daily from a total of 74 properties, with 322 gross wells, and a net interest totaling 232 wells. The natural-gasoline plant interests currently yield about 850 bbl. daily of gasoline and L.P.G. products.

**Kerr - McGee.**—Kerr - McGee, pioneer independent company headed by Sen. Robert S. Kerr, former governor of Oklahoma, is one of the country's largest drilling contractors. It has rigs operating from the Canadian border in the Rocky Mountain area to offshore locations in the Gulf of Mexico, as well as rigs on contract in the Kuwait Neutral Zone in the Middle East, and on the east coast of southern Mexico.

The firm also has extensive producing properties in southwestern states, and operates a modernized refinery at Wynnewood, Okla. Acquisition of the Crosbie properties thus increases Kerr-McGee's production by 1,800 bbl. daily, bulk of which comes from Smackover field of Arkansas and the East Texas field.

**Gasoline plants.**—The natural-gasoline plants in which Crosbie held interests, and which Kerr-McGee acquired from Sherry, are located in Fitts and Milfay pools near Cushing, Okla., with Warren Petroleum Corp. holding the remaining interests; and Garvin County plants, a series of natural-gasoline plants on the Golden Trend in western Garvin County, Oklahoma. The latter plants are jointly owned by several companies, but are operated by Warren Petroleum.

## MEETINGS

### A.P.I. Division to Meet

BEAUMONT, Tex.—A tentative program has been announced for the 1951 spring meeting of the southwestern district of the American Petroleum Institute's division of production, to be held here March 7-9.

The twenty-fourth annual district meeting is scheduled to begin March 7 with entire day devoted to sessions of district study and topical committees under the central committee on drilling and production practice. These are the primary cementing, drilling fluids, drilling practice, secondary recovery, core analysis, and well logging, thin-oil columns, and production-practice committees. All of these are open meetings.

Several civic and industrial leaders, including J. C. Donnell II, president of Ohio Oil Co. and vice president of A.P.I.'s division of production, have been engaged to address the general session March 8.

Papers to be presented March 8 and 9 will include: "Technological Progress During 50 Years," "Bit-Nozzle Speed in Relation to Horsepower," "Use of the Electric Analogy in Analysis of Deep-Well Pumping Problems," "Results of Survey on Primary Cementing Practices," "The Neutral Zones in Drill Pipe and Casing, and Their Significance," "Completion in Thin-Oil Columns," "FM Logging," "High-Speed Electronic Reservoir Analyzer," "Gravel-Packing Techniques," and "A Report on Oil-Emulsion Muds."

### Geological Meeting Set

DENVER.—A geological program covering all portions of the Rocky Mountain region from the San Juan basin to Canada will be held here March 1 and 2, sponsored by the Rocky Mountain section of the American Association of Petroleum Geologists.

The program, which will be opened with an address of welcome by Max L. Krueger, will feature 25 papers on recent discoveries and field development, geological field trips of local societies, geologic history, correlations, stratigraphy, structure and oil possibilities for various areas and basins throughout the region.

# Tidelands Hearings

## Senate committee opens discussions on temporary federal control of area; O'Mahoney resolution may be favored

**Bertram F. Linz**

WASHINGTON.—The Senate interior committee opened what promised to be lengthly hearings on temporary federal administration of the tidelands this week with some indications that the Korean War and the need for increased oil production would lead the committee, composed largely of members from interior states, to send a favorable report to the Senate on the O'Mahoney resolution *(The Oil and Gas Journal, January 25, page 174)*.

As the committee went into the tidelands matter for the third time in 18 months, some 35 senators appended their names to a resolution introduced by Sen. Spessard L. Holland, of Florida, to restore title to the states and expressed their willingness to fight the issue out on the floor of the Senate, confident that they now have sufficient votes to override a presidential veto.

**Ranks split.**—There were indications also that the defense program had split the ranks of the opponents of federal ownership. It was disclosed that Texas is willing to accept the O'Mahoney resolution provided some changes are made, and wait for Congress to pass quitclaim legislation. California and Louisiana are still standing firmly against any compromise, although some interests in California favor the Texas position. The industry, caught in the middle, is not "running out" on the states but since no oil producer can own a single foot of the underwater land, is less interested in who is to own it than in the adoption of some formula to encourage quick exploration and development.

**Texans not heard.**—Texas authorities were not among those scheduled to be heard by the committee, but in a joint statement Gov. Allan Shivers, Land Commissioner Bascom Giles, and Atty. Gen. Price Daniel said they favored the general purpose of the legislation, recognizing that production and exploration is essential in the emergency.

The three officials declared they would support any "reasonable" legislation that "does not contain anything that would prejudice our state in its effort to obtain permanent legislation restoring the ownership which it claimed and enjoyed prior to June 5, 1950."

No legislation that might be enacted, they said, should be used by either party to gain an advantage, and the O'Mahoney resolution should be amended to assure the protection of state equities in the submerged lands as well as the interests of the federal Government.

**Provisions asked.**—Texas also asked that provision be made for continuance of state operations within the "traditional boundaries" of the states or, alternatively, a plan for joint action along the lines of the stipulations which cover operations in California.

Further, it was declared, the legislation should provide that at least 37½ per cent of the revenues from the entire Continental Shelf should go to the states rather than merely a share of the revenues from the 3-mile zone.

A final proposal would define the seaward boundary of the states as 10½ miles in the case of Texas and such distance in excess of 3 miles "as the seaward boundary of any state existed at the time such state became a member of the union."

**Full support.**—The O'Mahoney measure was given the full support of both Solicitor General Philip B. Perlman for the Department of Justice, and Solicitor Mastin G. White for the Interior Department.

Perlman declared his department still favors the immediate enactment of permanent legislation for federal administration but, in view of the emergency, will accept the provision of interim authority.

Perlman estimated that refusal of the Supreme Court to hold the Government had paramount rights to the gulf offshore lands from June 23, 1947, the date of the California decision, had lost some $30,000,000 to the federal Government but said it was hoped the cutoff date of June 5, 1950, ordered by the court, might create a more favorable atmosphere for settlement of the controversy.

**Quitclaim doubted.**—Under questioning by Sen. Russell Long of Louisiana, Perlman expressed doubt that Congress can properly enact quitclaim legislation because the federal Government got its rights under its "national external sovereignty" with the acquiescence of the "family of nations" and pointed out that the Supreme Court had consistently avoided ruling that title to the lands lay in the United States. His opinion, however, was not acceptable to senators from the coastal states, who contended Congress could act.

Asked whether he would be willing to make stipulations with Texas and Louisiana, Perlman declared the Texas shoreline makes a stipulation unnecessary and the Government already has drawn a line between inland and sea waters in Louisiana and he doesn't think any agreement is required.

**Cites balks.**—But, he added, "I do not, if I can help it, want to get into the situation I am in in California" where, he said, the state officials have so far balked all efforts to define the dividing line between state and federal authority in the three segments from which oil is being produced.

Perlman also told Long he would object to any legislation simply ratifying present state leases without giving authority to the Secretary of the Interior to make new ones.

**Hallanan's statement.**—In a statement prepared for submission to the committee, Walter S. Hallanan, president of Plymouth Oil Co. and chairman of the offshore-lessees committee, stressed the importance of quickly securing additional production.

Hallanan pointed out that domestic production is approaching 6,000,000 bbl. daily, or about 1,100,000 bbl. in excess of the peak production in the last war, while at the same time we are importing more than 1,000,000 bbl. daily of crude and products.

"The impact of a world conflict on these foreign sources of supply is unpredictable," Hallanan said. "Many believe that the Middle East supply would be lost. In that event, we would not only be deprived of that oil we now utilize here at home, but we would also face the responsibility of furnishing from our own supply the necessary petroleum requirements of our allies overseas, who are now receiving supplies from the Middle East.

**Many concerned.**—"Many are also concerned about the possibility of a substantial reduction in supplies from South American sources which might result from sabotage in those countries where the oil fields are located or from extensive submarine warfare along the shipping lanes."

Hallanan explained that PAD has asked for a study of the cost of developing an additional 1,000,000-bbl. daily production in the Western Hemisphere, that would require intensification of exploratory and drilling activities to find new fields, he said, and the submerged lands "offer one of the largest potential producing areas in the continental United States yet to be extensively tested."

Already, Hallanan said, much of the time-consuming work of exploring any new area has been done and about $100,000,000 has been spent on specialized equipment.

# World Crude Production

## Steady upward rise interrupted in December as result of U. S. decline, but foreign production continued increase

Dahl M. Duff

THE steady upward rise in world crude-oil production was interrupted in December when total output dropped slightly as a result of a decline in the United States.

Foreign crude production, however, continued to increase. The greater part of this gain was due to another marked expansion in output in the Middle East where the December total was up nearly 90,000 bbl. daily over the previous month.

**U. S. output.**—United States production in December is estimated at 5,756,000 bbl. daily, down approximately 135,000 bbl. daily, or 2.3 per cent, from November. Total foreign production, exclusive of Russia and eastern Europe, was 4,572,700 bbl. daily, an increase of 98,600 bbl. daily, or 2.2 per cent, over November.

The decline in United States output was thus not completely offset by the increases shown in foreign fields. As a result, total world production, including estimated Russia and Communist eastern Europe, fell back approximately 36,000 bbl. daily to 11,237,800 bbl. daily in December.

**Trend broken.**—Although the drop in world output was only a fraction of a per cent, it broke the consistent rising trend shown in this figure since the early months of 1950. Last May, world production was approximately 9,850,000 bbl. daily, and since that time, it has been increasing by substantial amounts each month. Much of this was due to production increases in the United States which accounts for over half the world total.

Despite the decline from November, the December world total is 16.8 per cent over that for December 1949. United States production in December was 14.6 per cent above the year-earlier month, while foreign production, exclusive of Russia and eastern Europe, gained 22.3 per cent during the 12-month period.

By area, the greatest increase from December 1949 to December 1950 was in the Middle East. Here the increase during the period was approximately 477,000 bbl. daily, or nearly 32 per cent. Venezuela was up 12.6 per cent in December 1950 as compared to December 1949. The gain in this important producing area was less than that shown in the United States.

**Venezuela.**—Production in Venezuela last December was 1,622,400 bbl. daily. This was only an 11,000-bbl. daily increase over November, but it resulted in another production record in that country. Of the December

**WORLD CRUDE-OIL PRODUCTION**
**(Thousands of barrels daily)**

| Country— | Dec. 1950 | Nov. 1950 | Dec. 1949 |
|---|---|---|---|
| **Western Hemisphere:** | | | |
| Argentina | 65.0 | 65.8 | 60.8 |
| Bolivia | 1.7 | 1.8 | 2.1 |
| Brazil | 0.7 | 1.4 | 0.4 |
| Canada | 92.4 | 104.7 | 55.8 |
| Chile | 1.7 | 1.7 | 2.2 |
| Colombia | 103.0 | 99.0 | 82.4 |
| Cuba | 0.2 | 0.2 | 0.4 |
| Ecuador | 7.5 | 7.5 | 7.3 |
| Mexico | 228.0 | 220.0 | 179.9 |
| Peru | 43.0 | 42.9 | 40.7 |
| Trinidad | 57.0 | 57.1 | 55.8 |
| Venezuela | 1,622.4 | 1,611.7 | 1,440.8 |
| Total | 2,222.6 | 2,213.8 | 1,928.6 |
| **Europe and Africa:** | | | |
| France | 4.2 | 4.2 | 1.2 |
| French Morocco | 0.9 | 0.9 | 0.5 |
| Germany | 23.4 | 23.1 | 18.4 |
| Italy | 0.1 | 0.2 | 0.2 |
| Netherlands | 12.6 | 12.6 | 12.0 |
| Egypt | 45.9 | 45.6 | 44.9 |
| United Kingdom | 0.9 | 0.9 | 0.9 |
| Total | 88.0 | 87.5 | 78.1 |
| **Middle East:** | | | |
| Bahrein | 29.9 | 29.7 | 30.3 |
| Iran | 726.7 | 657.4 | 603.6 |
| Iraq | 166.8 | 156.2 | 122.2 |
| Kuwait | 403.7 | 396.7 | 271.1 |
| Qatar | 43.0 | 38.6 | 21.0 |
| Saudi Arabia | 617.9 | 620.1 | 462.4 |
| Turkey | 0.4 | 0.4 | 0.6 |
| Total | 1,988.4 | 1,899.1 | 1,511.2 |
| **Other Asia:** | | | |
| British Borneo | 95.0 | 95.0 | 79.0 |
| Burma | 2.0 | 2.0 | 0.5 |
| China | 2.0 | 2.0 | 1.5 |
| India | 5.2 | 5.2 | 5.3 |
| Indonesia | 155.0 | 155.0 | 124.0 |
| Japan | 6.0 | 6.0 | 4.2 |
| New Guinea | 4.8 | 4.8 | 4.8 |
| Pakistan | 3.7 | 3.7 | 3.0 |
| Total | 273.7 | 273.7 | 222.3 |
| Total, foreign less Russia and E. Europe | 4,572.7 | 4,474.1 | 3,740.2 |
| **Estimated Russia and Eastern Europe:** | | | |
| Austria | 25.0 | 25.0 | 20.0 |
| Romania | 85.0 | 85.0 | 90.0 |
| Russia | 775.0 | 775.0 | 730.0 |
| Other E. Europe | 24.1 | 24.1 | 19.0 |
| Total | 909.1 | 909.1 | 859.0 |
| Total, foreign | 5,481.8 | 5,383.2 | 4,599.2 |
| United States | 5,756.0 | 5,890.8 | 5,024.3 |
| World total | 11,237.8 | 11,274.0 | 9,623.5 |

Figures are from reliable reports in the industry or official government sources. Data for Russia and Eastern Europe are based on competent estimates; no authentic information is available on month-to-month production in these areas. Current reports are also lacking for certain areas in Southeast Asia.

XUM

# Horton* Double-Deck Floating Roofs

## . . . save over 46,000 BARRELS every year at this tank farm!

Each of the 16 tanks shown in the above view at the Gulf Oil Corporation's Darby Creek tank farm near Philadelphia holds 96,000 bbls. of crude oil. The average daily throughput is 108,000 bbls. which means that each tank is filled and emptied about 26 times per year.

The table at the right indicates the savings Gulf effected by equipping each tank with a Horton Double-Deck Floating Roof. By interpolation, the figures show that each Horton Double-Deck Floating Roof saves 2,000 bbls. annually (compared to a cone roof tank) in *filling* evaporation losses. The estimated saving of *breathing* losses from each crude oil tank is 900 bbls. annually. Totalling the two, *each* Horton Double-Deck Floating Roof at Darby Creek saves about 2,900 bbls. annually in breathing and filling losses. That amounts to about *46,000* bbls. annually for the entire tank farm.

A construction feature had much to do with making these impressive savings. It's the Horton seal that is used to close the space between the deck of a Horton Floating Roof and the tank shell. It's an exclusive feature—and the best device ever invented for preventing the escape of vapor around the edge of a floating roof deck.

How many bbls. can the Horton Double-Deck Floating Roof save on your gasoline or crude oil tanks? Bulletin B has the answer. Write for a copy.

EVAPORATION LOSS IN BARRELS OF 42 U.S. GAL.

| TANK SIZE | *Gastight Cone Roof* | | *Horton Floating Roof* | |
|---|---|---|---|---|
| *Capacity in Barrels* | *Annual Breathing* | *One Filling* | *Annual Breathing* | *One Filling* |
| 10,000 | 150 | 8 | 32 | 0 |
| 20,000 | 268 | 16 | 46 | 0 |
| 30,000 | 375 | 24 | 57 | 0 |
| 40,000 | 480 | 32 | 64 | 0 |
| 50,000 | 575 | 40 | 70 | 0 |
| 60,000 | 672 | 48 | 78 | 0 |
| 70,000 | 763 | 56 | 84 | 0 |
| 80,000 | 848 | 64 | 88 | 0 |
| 100,000 | 1,030 | 80 | 100 | 0 |

*The losses shown in the table above are based on a Mid-Continent Crude having an API gravity of 38 degrees. The cone roof tanks average one-third full.*

*NOTE: All of the plates in the tanks shown above were pickled and painted by the Phoscote process. This process removes the mill scale and thus provides a clean surface for painting. It also deposits on the steel a thin coating of iron phosphate that is rust-retarding and furnishes a good paint bond. Ask about "Phoscoting" for your next job.*

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Birmingham, 1—1536 North 50th St.
Boston, 10—1025—201 Devonshire St.
Chicago, 4—2128 McCormick Bldg.
Cleveland, 15—2204 Guildhall Bldg.
Detroit, 26—1514 Lafayette Bldg.
Havana—402 Abreu Bldg.
Houston, 2—2119 National Standard Bldg.
Los Angeles, 17—1523 General Petroleum Bldg.
New York, 6—3347—165 Broadway Bldg.
Philadelphia, 3—1615—1700 Walnut Street Bldg.
Salt Lake City, 4—525 West 17th South St.
San Francisco, 4—1554—200 Bush St.
Seattle, 1—1325 Henry Bldg.
Tulsa, 3—1606 Hunt Bldg.

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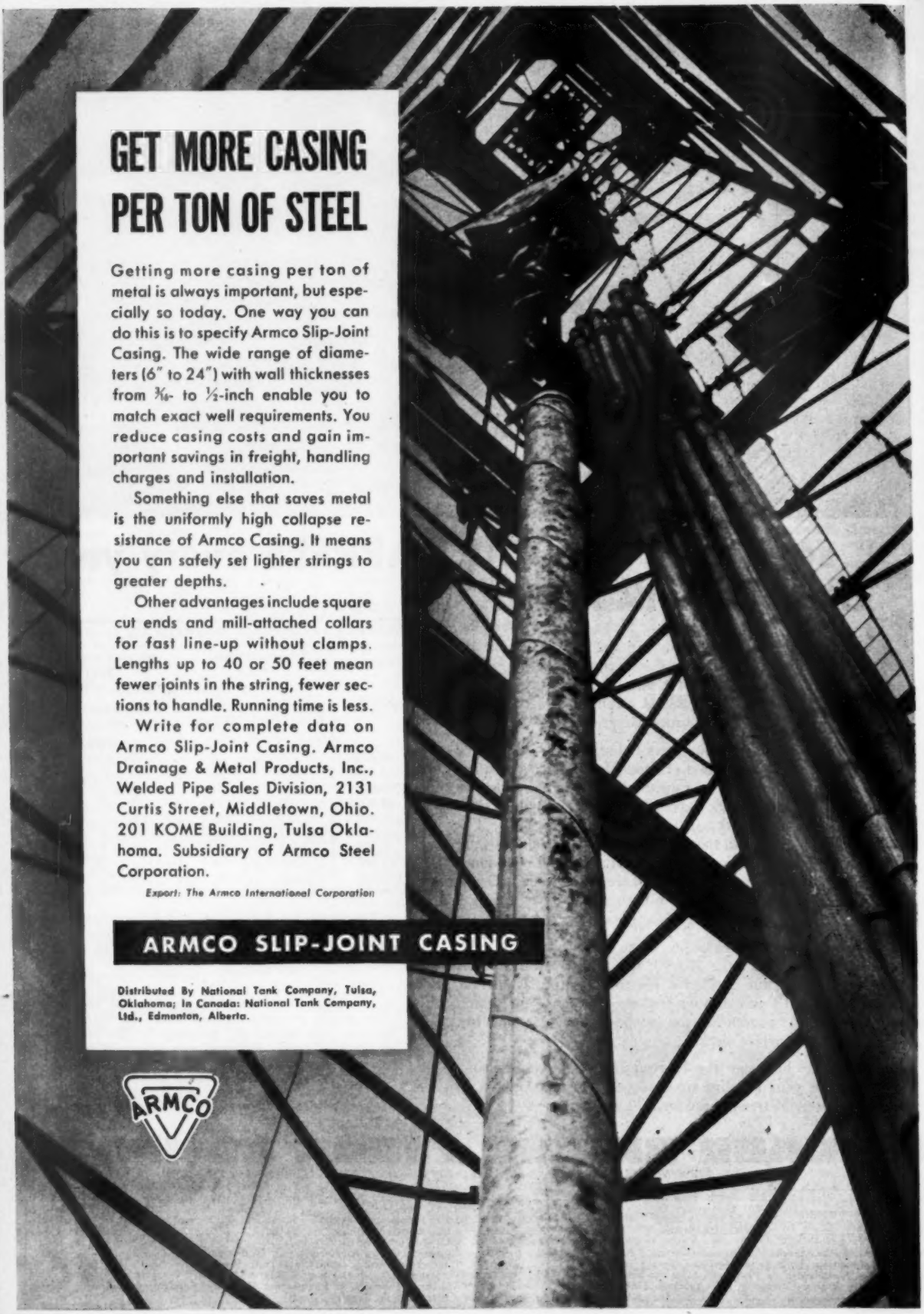

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Getting more casing per ton of metal is always important, but especially so today. One way you can do this is to specify Armco Slip-Joint Casing. The wide range of diameters (6" to 24") with wall thicknesses from 3/16- to 1/2-inch enable you to match exact well requirements. You reduce casing costs and gain important savings in freight, handling charges and installation.

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Other advantages include square cut ends and mill-attached collars for fast line-up without clamps. Lengths up to 40 or 50 feet mean fewer joints in the string, fewer sections to handle. Running time is less.

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**PRODUCTION IN VENEZUELA BY MAJOR FIELDS**
(10,000 bbl. daily or more)

| Field— | Dec. 1950 | Nov. 1950 |
|---|---|---|
| Eastern Venezuela: | | |
| Quiriquire | 78,494 | 76,480 |
| Oficina | 51,654 | 51,161 |
| Jusepin | 24,147 | 25,854 |
| Mulata | 16,850 | 17,442 |
| Pedernales | 10,764 | 11,773 |
| Nipa | 41,395 | 40,970 |
| Las Mercedes | 22,243 | 20,599 |
| Santa Barbara | 17,392 | 17,057 |
| Guico | 11,683 | 11,603 |
| Guara | 61,645 | 61,869 |
| Chimiri | 55,832 | 55,589 |
| Western Venezuela: | | |
| Cabimas | 84,039 | 83,361 |
| Lagunillas | 404,757 | 402,958 |
| Tia Juana | 173,241 | 170,974 |
| La Paz | 165,969 | 165,612 |
| Bachaquero | 141,217 | 138,683 |
| Mene Grande | 46,831 | 46,681 |
| El Cubo | 14,210 | 14,528 |
| Mara | 75,689 | 79,571 |
| Boscan | 13,951 | 14,052 |

total, 1,141,032 bbl. daily came from western Venezuela, and 481,400 bbl. daily from eastern Venezuela. Weekly figures show that the increase occurred during the latter half of the month. For the week ended December 4, Venezuela's production was 1,614,100 bbl. daily. For the week ended December 25, it was 1,626,900 bbl. daily, and the week ended January 1, 1,636,800 bbl. daily.

The Ministry of Mines and Hydrocarbons in Venezuela reported that the December production brought the average for 1950 to 1,497,985 bbl. daily. Of this, production by companies was: Creole, 685,839 bbl. daily; Shell, 461,601 bbl. daily; Mene Grande, 202,211 bbl. daily; Socony-Vacuum, 37,003 bbl. daily; Texas, 25,711 bbl. daily; Atlantic, 20,944 bbl. daily; Mercedes, 18,706 bbl. daily; Sinclair, 12,598 bbl. daily; Richmond, 12,502 bbl. daily; Pantepec, 12,318 bbl. daily; Phillips, 7,492 bbl. daily, and others, 1,061 bbl. daily. The 1950 production compares with 1,321,367 bbl. daily in 1949, and 1,338,794 bbl. daily in 1948.

**Canada.**—Canadian production was down more than 12,000 bbl. daily in December. November output as reported by the Dominion Bureau of Statistics was an all-time high averaging 104,700 bbl. daily, a revision of earlier estimates. Establishment of new production quotas for wells in Alberta was responsible for the decline in December. In the week ended December 4, Alberta's output dropped more than 6,000 bbl. daily. In that week, the province produced 93,313 bbl. daily from 1,936 wells capable of being operated.

Crude production in Colombia in December reached a record 103,000 bbl. daily. In Mexico, the 228,000 bbl. daily produced in December was a record in the recent petroleum history in that country.

In Europe, western Germany made another of the slight increases in production that has characterized operations in this country for the last 2 years. The total was 102,805 metric tons, equivalent to 23,400 bbl. daily. Of this, 46,753 tons was from the Emsland area, 45,553 tons from Hanover, 10,034 from Schleswig-Holstein-Hamburg, and 510 tons from Baden

**Middle East.**—The 89,300-bbl. daily increase in production in the Middle East in December brought output in this region to just below the 2,000,000-bbl. daily mark. This November-to-December gain represented an increase of 4.7 per cent. Most of it was due to a sharp increase in Iran.

**TREND OVER LAST YEAR**

| | Western Hemisphere less U. S. | Middle East | Total foreign less Russia and E. Europe |
|---|---|---|---|
| January | 1,946.5 | 1,491.4 | 3,733.4 |
| February | 1,820.6 | 1,366.6 | 3,689.4 |
| March | 1,900.4 | 1,607.4 | 3,812.9 |
| April | 1,968.2 | 1,639.5 | 3,918.2 |
| May | 1,775.4 | 1,752.0 | 3,847.4 |
| June | 2,096.2 | 1,811.5 | 4,229.6 |
| July | 2,073.2 | 1,808.3 | 4,202.6 |
| August | 2,097.8 | 1,839.5 | 4,273.6 |
| September | 2,146.1 | 1,803.7 | 4,297.1 |
| October | 2,185.7 | 1,893.2 | 4,428.9 |
| November | 2,213.8 | 1,899.1 | 4,474.1 |
| December | 2,222.6 | 1,988.4 | 4,572.7 |

Iranian production rose to a record 2,945,000 long tons, equivalent to approximately 726,700 bbl. daily. This was an increase of more than 10 per cent over the November total which was approximating 657,400 bbl. daily. It compares with the previous high of 706,500 bbl. daily last March.

Another increase to a new record, though not as sharp as in Iran, was reported in Kuwait. Crude production, going above 400,000 bbl. daily for the first time, reached 403,700 bbl. daily. The December output was a 1.8 per cent gain over the November daily average of approximately 396,700 bbl. daily.

**Arabia down.**—Saudi Arabian production was down slightly. The December daily average of 617,900 bbl. daily was a minor drop of 2,200 bbl. daily from the November production. Saudi Arabian production reached a high of 643,100 bbl. daily in October and has been 20,000-25,000 bbl. daily below this for the last 2 months.

The fourth major producer in the Middle East, Iraq, showed a production gain of about 10,000 bbl. daily in December. All but about 8,000 bbl. daily of this comes from Kirkuk field which is limited by available pipe-line capacity to the Eastern Mediterranean. Further major increases in Iraq's production will come with the completion in about 1½ years of the 30-in. line now under construction.

**Asia unchanged.**—In Southeast Asia, there were no reports to indicate significant change in the production of the various areas. The continued rising trend in the production of British Borneo was borne out recently by a report from the Shell organization in London which said that in January output in Seria field in Brunei had reached a record rate of 100,000 bbl. daily, or about 5,000,000 tons annually.

## AUSTRALIA

# Shale-Oil Effort

### It is abandoned after 10 years by Australia

THE Australian Government has decided to abandon its 10-year effort to produce economically oil from shale at Glen Davis in New South Wales.

The Australian fuel minister, George McLeay, said in Canberra that costs of production, including interest in money invested, has been 5/3 per gallon. On the basis of the present value of the Australian pound, this is the equivalent of about 49 cents per U. S. gallon.

Annual production at Glen Davis has been 2,750,000 gal. or approximately 78,500 bbl. Excluding interest costs, the cost of the output at the shale works was 4/1, or the equivalent of about 38½ cents a U. S. gallon. By comparison, the minister pointed out, motor fuel can be imported into the country for one-third, or about 11.7 cents a U. S. gallon.

**Losses cited.**—Over-all losses in producing the relatively small amount of motor fuel have been heavy. During the 10 years of operation up to the end of 1950, the deficit was approximately £4,000,000 or about $9,000,000. Future losses would be estimated at about £350,000 a year, plus interest on the investment.

The Glen Davis plant, located in the Blue Mountains, was operated by National Oil Pty. with the aid of government subsidies. The oil shale used was obtained from the Newnes-Capertee deposit. The fuel minister said that a committee was examining the best means of using the Glen Davis refining equipment. It will be used to treat imported crude either at Glen Davis or at a coastal site.

**Crude lacking.**—Australia is wholly lacking in crude sources, and the continued effort to obtain economic shale production reflects the country's desire to develop some form of domestic oil output. Numerous test wells have been drilled in Australia over the last 50 years, but without success. Best chance of developing oil on Australian territory appears to lie in the exploratory work now being carried out in Southeast New Guinea jointly by Anglo-Iranian Oil Co., Ltd., Standard-Vacuum Oil Co., and Australian capital through Australasian Petroleum Co., Pty.

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*This aerial view shows the location of the Wana well, which is now testing at 9,866 ft. A narrow-gage rail line runs from river bank back past the operations buildings and hospital. Staff quarters, club, and mess are at the end of the clearing in the center of the photo. The picture illustrates the low, swampy jungle terrain.*

FAR EAST

# New Guinea Program

## Two oil firms, with some Australian capital, carrying on exploration work despite tremendous difficulties

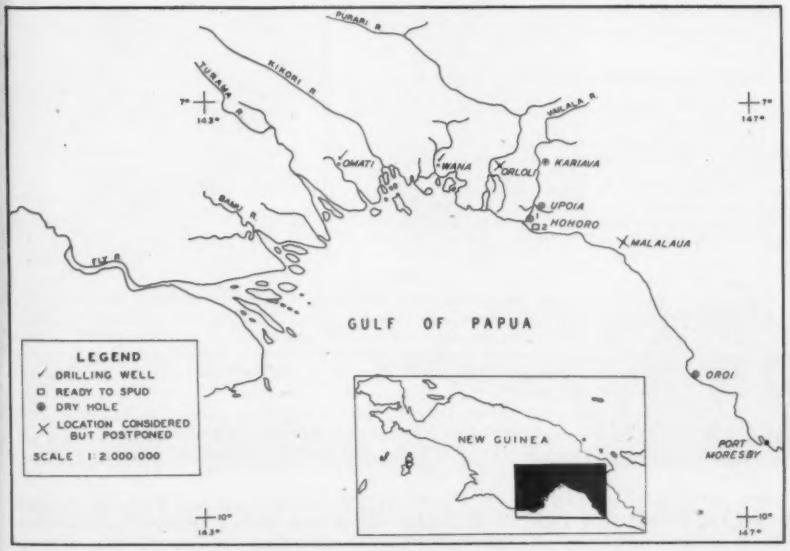
**Dahl M. Duff**

DESPITE four dry holes, enormous difficulties of climate and terrain, and the problems created in drilling through a plastic mudstone formation, two large oil companies, together with some Australian capital, are continuing a costly 13-year effort to find and develop commercial production in southeastern New Guinea.

The program is being carried out by Australasian Petroleum Co., Ltd., Pty., in which D'Arcy Exploration Co., Ltd. (Anglo-Iranian Oil Co., Ltd.), and Vacuum Oil Co., Pty., Ltd. (Standard-Vacuum Oil Co.), each have about 41 per cent interest with the remainder held by Oil Search, Ltd.

**Started before war.**—A.P.C. began its exploration in New Guinea before the war. Geological and geophysical work was done, and the first well, at Kariava, was down to about 5,000 ft. in January 1942 when the program was shut down because of the Japanese invasion. Operations were resumed in 1946 and have since been considerably expanded. It has been estimated that well over $20,000,000 has been spent thus far.

Back of this intensive exploration is the fact that the prospects in New Guinea are considered the best on Australian territory. Australia has long hoped for a domestic source of oil production, and increasing imports and consumption in the last few years have made its needs even more apparent.




*Map showing location of current drilling activity.*

Australian territory includes the eastern part of New Guinea which is divided into Papua to the south and the Territory of New Guinea to the north. The latter is under United Nations Trusteeship to Australia. The western part of New Guinea is under Dutch control. In the Vogelkop section near the western end of Dutch New Guinea, about 5,000 bbl. daily has been produced for the last 2 years by a joint company representing Shell, Standard-Vacuum, The Texas Co., and Standard Oil Co. of California.

D'Arcy and Standard-Vacuum, the principal backers of A.P.C., after the war participated in some exploration in Australia proper but withdrew about 2 years ago to concentrate on the program in New Guinea. Australia's interest in the present operations is pointed up by the fact that in the last 1949-50 fiscal year the commonwealth imported nearly 100,000 bbl. daily of crude and products, virtually its total requirements.

**A.P.C. program.**—The A.P.C. program, with D'Arcy the operator, has been carried out in the southeastern section of Papua, around the Gulf of Papua and northwest of Port Moresby, the main operating headquarters of the company. The coastal region is described as a featureless swampy jungle offering no surface geological indications. A number of rivers drain into the Gulf of Papua and these provide the main avenues of transportation for the operation.

Rainfall in this region is 200 in. a year or more. At Omati, the location for the latest test, it actually exceeds 300 in. a year, or an average of more than 0.8 in. a day. Adding to the difficulties of the work is the fact that there is little or no gravel obtainable for road construction or surfacing.

In these circumstances, it is not surprising that A.P.C. has spent as much as 1½ years preparing location and access for drilling. At the Wana site, the company worked for months clearing and draining the area, moving in and erecting the rig, building a wharf and railroad to handle supplies, and providing housing, laboratory, and other necessary facilities. Cost of this preparatory work was estimated at $100,000.

**Labor force.**—In addition to its New



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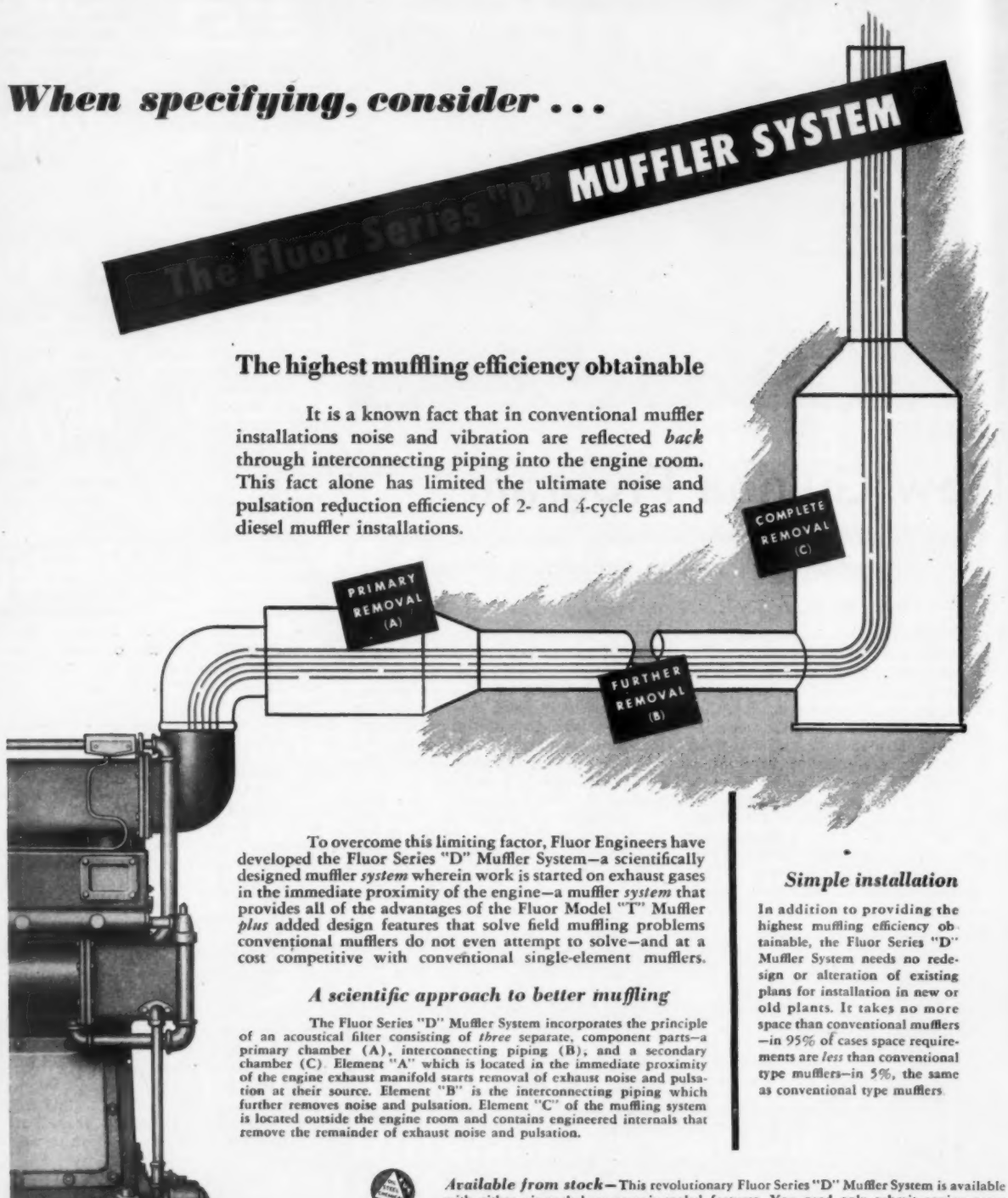
### The highest muffling efficiency obtainable

It is a known fact that in conventional muffler installations noise and vibration are reflected *back* through interconnecting piping into the engine room. This fact alone has limited the ultimate noise and pulsation reduction efficiency of 2- and 4-cycle gas and diesel muffler installations.




To overcome this limiting factor, Fluor Engineers have developed the Fluor Series "D" Muffler System—a scientifically designed muffler *system* wherein work is started on exhaust gases in the immediate proximity of the engine—a muffler *system* that provides all of the advantages of the Fluor Model "T" Muffler *plus* added design features that solve field muffling problems conventional mufflers do not even attempt to solve—and at a cost competitive with conventional single-element mufflers.

### *A scientific approach to better muffling*

The Fluor Series "D" Muffler System incorporates the principle of an acoustical filter consisting of *three* separate, component parts—a primary chamber (A), interconnecting piping (B), and a secondary chamber (C). Element "A" which is located in the immediate proximity of the engine exhaust manifold starts removal of exhaust noise and pulsation at their source. Element "B" is the interconnecting piping which further removes noise and pulsation. Element "C" of the muffling system is located outside the engine room and contains engineered internals that remove the remainder of exhaust noise and pulsation.

### *Simple installation*

In addition to providing the highest muffling efficiency obtainable, the Fluor Series "D" Muffler System needs no redesign or alteration of existing plans for installation in new or old plants. It takes no more space than conventional mufflers—in 95% of cases space requirements are *less* than conventional type mufflers—in 5%, the same as conventional type mufflers.

***Available from stock***—This revolutionary Fluor Series "D" Muffler System is available with either air-cooled or non-air-cooled features. You need only submit engine room design and dimensions, the make and model of engine and whether the muffling system is to be air-cooled or non-air-cooled. Fluor will recommend sizing and type of installation for your approval. Submit your plans for recommendation and quotation today—no obligation, of course.

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Guinea labor force, the company has a staff of about 400 Australians and British. Drillers and other field employes were given training in Iran and the United States, especially on drilling through heaving shale. Houseboats and former army landing craft are used extensively.

A.P.C. placed its first fully waterborne seismic-reflection party in the field several months ago. The group represented Seismograph Services, Ltd., contractors for the work. They live in specially constructed houseboats and use a fleet of small craft as transportation from their floating camp. Previous geophysical work included magnetic, gravity, and refraction seismograph.

**Mudstone.**—The New Guinea mudstone which has been the cause of so much drilling difficulty in Papua is closely akin to heaving shale but is a finer, more viscous mixture and becomes almost a liquid under the compressive forces found in the steeply folded areas. Similar conditions, but to a somewhat lesser extent, have been encountered on the Gulf Coast and in Trinidad.

The mudstone was particularly troublesome in the Hohoro and Upoia tests. In the first, the formation was encountered just below 2,000 ft. Inability to prevent cavings of the hole finally caused abandonment. At Upoia, the company succeeded in drilling only about 2,700 ft. in a year's time. It was necessary to sidetrack frozen drill pipe in this well.

**Mud program.**—A carefully controlled mud program is required with wells in this formation. Mud weight is carefully watched, and chemicals added to reduce the viscosity. Last year, O. B. Rylander, division manager with Socony-Vacuum Oil Co. of Venezuela, was placed on loan with Standard-Vacuum and sent to New Guinea to assist with the drilling.

A.P.C. is now using three rigs, two National 50s, and one National 100. The Wana well was last reported testing at total depth of 9,866 ft. This well, spudded last May, is located to the west of the earlier drilling and is in the so-called Delta region where somewhat easier drilling conditions have been encountered.

Another of the drilling wells is at Omati, spudded last fall and reported drilling below 550 ft. The location is still farther west of Wana and about 280 miles northwest of Port Moresby, 28 miles inland from the coast.

The Omati test is being drilled by Island Exploration Co. in which the same three companies are interested and which is under the same management as A.P.C. The well is being drilled on the Darai structure, one of three which have been outlined in this particular area. The location is in rugged limestone country, and a mile of road was built along the edge of an escarpment to reach the camp which is 150 ft. above the unloading point on the Omati River.

The heavier of the three rigs will be used to drill the second test at Hohoro. The location is close to the coast. There are gas seepages nearby, and shows were reported to have been encountered at shallow depths in the first unsuccessful well.

**Kariava well.**—The Kariava well, which was commenced before the war, was finally abandoned in March 1948 as the first of the four dry holes which have been drilled in the A.P.C. program. Located near the Vailala River, about 75 miles from the Gulf of Papua, the test was taken to 12,621 ft. to become the deepest ever drilled in Australasia.

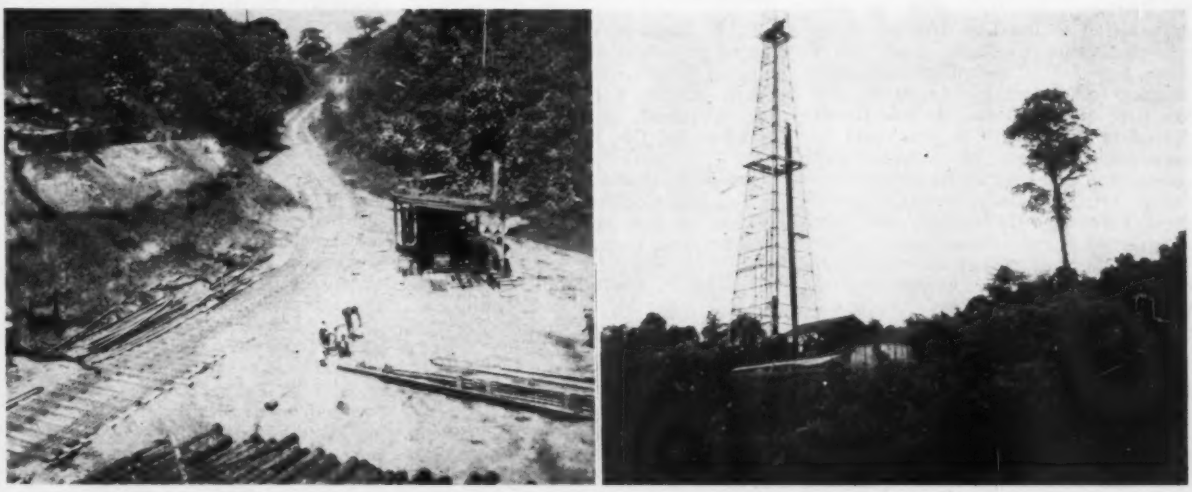
The second attempt was at Oroi about 56 miles northwest of Port Moresby. The well was spudded in September 1948 and abandoned in November of the following year at 5,516 ft. There were no commercial shows, and the permit area in which it was drilled was turned back.

**Upoia test.**—Third was the Upoia test north of Hohoro. This was spudded in January 1949 and abandoned last September at 5,356 ft. after much trouble in the drilling. The subsurface formations were reported highly faulted and showing no porosity or permeability.

The fourth unsuccessful well was the 1 Hohoro. About 1½ years was required for site preparation. It was spudded in March 1949 and abandoned about a year later at 4,721 ft.

**Previous activities.**—Although the current program represents the most determined and comprehensive effort to find oil in Australian New Guinea, the record of exploration in these territories dates back to well before World War I. In Papua, first definite indications of oil occurred in 1911 with the discovery of gas seepages at Opa. In northeastern, then German, New Guinea, two German companies worked certain areas and found a small amount of oil in wells near Aitape.

In 1913, Dr. Arthur Wade, well-known Australian geologist and later chairman of the Commonwealth Oil Advisory Committee, surveyed the Vailala River section and recommended energetic development. Through the twenties, parts of Australian New Guinea were explored and several wells drilled by Anglo-Persian Oil Co., Ltd. (now Anglo-Iranian) with financial support from the commonwealth government. Most of the wells were abandoned at comparatively shallow depths because of drilling difficulties.



*Shown at left is part of the approach road to the rig site at Hohoro. Corduroying and steel matting are required. At this location, Australasian Petroleum is about to begin its second well. Right, is the Upoia test before its abandonment. The well encountered considerable difficulty drilling through the mudstone formation. It was taken to 5,356 ft. All photos by Brian Chirlian, Sydney, Australia, and from Standard-Vacuum Oil Co.*

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# PERSONALS

## A.I.M.E. Chairman

### Richard W. French is new head of petroleum branch

RICHARD W. FRENCH, vice president in charge of production operations of Sohio Petroleum Co. and newly installed chairman of the petroleum branch of the A.I.M.E., has completed his twentieth year in engineering.

He was born in Colorado Springs in 1907. His early education was in various schools in Colorado, Nevada and California. After receiving a B.S. degree in mechanical engineering from the University of Delaware in 1929, he joined General Electric Co.

French joined Continental Oil Co. on February 6, 1933, as a roustabout at Ventura. By May 1936, he was transferred to the Los Angeles office as production engineer, and for 7 years handled all petroleum and production engineering operations for the firm in California. He was transferred to Ponca City in May 1943 as assistant manager of Continental's production and drilling department.

On June 1, 1947, French joined Sohio Petroleum Co. in Oklahoma City as chief engineer and assistant to the vice president in charge of production operations. Promotion was rapid and by March 1, 1948, he was made assistant manager of production operations and chief petroleum engineer. Two months later, he was elected vice president in charge of production operations.

For more than 15 years, he has been active in A.P.I. and A.I.M.E. leadership. In 1941, he was named national chairman of the A.P.I. Topical Committee on Production Practice. Following Pearl Harbor, he worked full time for 5 months as coordinator of California production for the PAW.

**Claude O. Weekley,** district production superintendent for Murphy Corp. at Graham, Tex., has been transferred to Odessa, Tex., in the same capacity.

**H. E. Wendt,** field engineer for Tide Water Associated Oil Co. at Midland, Tex., has been transferred to Hobbs.

**Henry A. Campe,** formerly assistant regional geologist for Atlantic Refining Co., Dallas, has been transferred to Tulsa as district geologist for the northern Oklahoma district.

**J. B. Dickey,** formerly assistant manager of Continental Oil Co.'s Kansas City marketing division, has been named division manager, succeeding **George M. Sullivan,** who recently was named regional general manager for Continental eastern region, New York.

**R. A. Kent** and **R. A. Flohr,** formerly engineer trainees for Shell Oil Co. in its Los Angeles division offices, have been transferred to Long Beach as exploitation engineers. **Robert C. McNeill,** engineer trainee at Bakersfield, Calif., has been transferred to Long Beach as mechanical engineer.

**R. A. Malott,** division drilling foreman for Shell Oil Co. in the Bakersfield, Calif., area, has been transferred to Long Beach where he will act in the same capacity in the Los Angeles division. Other transfers in Shell's drilling department include: **W. C. Thompson** and **L. A. Ebaugh,** drilling foreman, from Ventura, to Bakersfield, Calif.

**Dalton Moore, Jr.,** district engineer for The Chicago Corp. at Bishop, Tex., has been transferred to Corpus Christi, Tex., as reservoir engineer.

**W. S. Sargent,** Ohio Oil Co., was elected president of the Michigan Oil and Gas Scouts Association. **Dale Anderson,** Carter Oil Co., was elected vice president, and **Melvin Sauter,** Chartiers Oil Co., secretary-treasurer.

**George E. Burton,** district geologist for Sun Oil Co., has retired and will continue to live in Gainesville, Tex., working as a consultant.

**William F. Shelton,** petroleum engineer for Humble Oil & Refining Co., has been transferred from New Orleans to Grand Isle, La.

**Henry Salvatori,** president of Western Geophysical Co. of America, has been elected chairman of the Wildcat Committee of the Western Oil and Gas Association, Los Angeles. Other officers elected were: **Maurice A. Machris,** executive vice president of Wilshire Oil Co., vice chairman; **S. Z. Natcher,** assistant to the vice president of Standard Oil Co. of California, treasurer; and **D. S. Kilgour,** secretary of the association, secretary.

**Edward Scott, Jr.,** production engineer for Skelly Oil Co. at Carthage, Tex., has been moved to Athens, La.

*R. L. FOSTER*

**Rayburn L. Foster** has been elected a director and a member of the executive committee of Phillips Petroleum Co., succeeding **F. E. Rice,** vice president of natural gasoline and gas, who retired after 33 years with the company. Foster, who has been associated with Phillips for over 22 years, became vice president and general counsel of the firm January 1.

**P. N. Hazel, Jr.,** senior chemical engineer since 1947 in General Petroleum Corp.'s Torrance, Calif., refinery, has been named refinery engineer. **F. S. Kirkman,** junior refinery engineer at Torrance, was also named refinery engineer.

**J. L. Franklin,** research associate at Humble Oil & Refining Co.'s Baytown, Tex., refinery, has resigned to become the new head of University of Minnesota's department of chemical engineering at Minneapolis.

**Dr. John H. Sandidge,** Magnolia Petroleum Co., San Antonia, has been elected president of the South Texas Geological Society. Other new officers are: **James K. Rogers,** Arkansas Fuel Oil Co., vice president; **Roland F. Hodder,** Stanolind Oil & Gas Co., secretary; **Charles M. McDaniel, Jr.,** Atlantic Refining Co., treasurer; and **Robert G. Kurtz,** Ohio Oil Co., executive committee member.

**W. L. Blansett** has been appointed foreman of the pumping and gaging department at Humble Oil & Refining Co.'s Baytown, Tex., refinery, succeeding **Howard E. Humphrey,** who recently retired. Other new assignments include: **Paul John, Jr.,** assistant process superintendent; **F. C. Fowler,** general foreman of light ends; **J. N. Chatfield,** assistant general foreman of light ends; **J. W. Smalling,** assistant general foreman of light ends; **T. E. Peterson,** assistant general foreman of distillation; **J. S. Keating,** assistant general foreman of distillation; **P. G. Cater,** general foreman of treating; **C. G. Phillips,** assistant general foreman of lube extraction; **J. H. McCulley,** assistant general foreman of cracking and polymerization; **J. R. Barsalou, Jr.,** assistant head of the coordinating division; **A. J. Thaman,**



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# PERSONALS

assistant superintendent of oil movements division; **B. E. Wilson,** assistant superintendent of oil movements division; **C. E. Smith, Jr.,** assistant superintendent of oil movements division; **L. J. Fentiman,** assistant dockmaster; **Ray Robertson,** assistant night superintendent; **C. C. Pool,** assistant night superintendent; **L. P. Jones,** chief accountant; **J. P. Henderson,** assistant chief accountant; **W. H. Fortney, Jr.,** assistant superintendent of maintenance and construction (crafts); **J. R. Martin,** general foreman of the instrument department; **A. P. Lowe,** assistant general foreman of the instrument department; **C. W. Bates,** foreman (instrument) RuR SR-10 (mechanical maintenance); **R. R. Warne,** zone superintendent over central shops; **J. M. Manuel,** supervisor of Zone 1; and **J. R. Seydler,** supervisor of Zone 3.

**Dr. Harold A. Palmer** has joined United Gas Corp. at Shreveport in the chemistry section of the research department. He was formerly head of the department of physical sciences at Midwestern University.

**E. N. Van Duzee,** production manager for Shell Oil Co., New Orleans area, has been elected president of the Petroleum Club of New Orleans, succeeding the late Harrison F. Carr.

**R. L. Hendrickson,** district geologist for Union Oil Co. of California at Corpus Christi, has been named assistant division geologist and transferred to the firm's Houston office. **Dick Spencer** succeeds Hendrickson at Corpus Christi.

**John Kelly,** assistant manager of Continental Oil Co.'s motor-transportation division, Ponca City, Okla., has been named administrative assistant to **W. L. Kygar,** president of Continental Pipe Line Co. **Elmo P. Hester,** Houston, regional contract superintendent in the southern region of Continental's motor-transportation division, has been named to succeed Kelly as assistant manager of the division. Kelly will continue to make his headquarters in Ponca City, and Hester will move from Houston to Ponca City in his new assignment.

**Duncan C. Stevenson,** district manager for Shell Oil Co., New Orleans, has been elected Louisiana chairman of the Oil Industry Information Committee. **E. H. Simpson,** owner of Independent Petroleum Co., Jackson, Miss., has been elected to the same position for Mississippi.

**Ralph W. Collins,** formerly division engineer of the North Texas and New Mexico division of Stanolind Oil & Gas Co., Fort Worth, has joined Pan-Am Production Co. at Shreveport, La., as assistant to **M. C. Hoffman,** vice president. Collins will work in exploration and production.

**John W. Packie,** supervising engineer in the process design department for Esso Standard Oil Co., has been named chief design engineer as head of the design engineering branch, a change that stems from the recent death of Charles F. Hesselbach, chief mechanical engineer. Other changes include: **Channing C. Nelson,** assistant supervising engineer, moved to the post of supervising engineer of process design; **Charles W. Smith,** assistant supervising engineer of the process test division, succeeds Nelson as supervising engineer; **Raymond E. Bittner,** former senior project engineer, also was appointed as an assistant supervising engineer in this division; **Benjamin L. Bragg,** senior project engineer in the process engineering and economics division, also became an assistant supervising engineer in the process test unit; **M. Ritchie Smith** and **Henry Ernst, Jr.,** former group heads in that division, became senior project engineers; **George P. Baumann** and **Ashley R. Sydnor, Jr.,** succeed Smith and Ernst; and **George B. Cook,** supervising engineer in the mechanical engineering and economics division, assumed the additional duties of chairman of the standards committee.

**H. G. Graham,** field superintendent for Stanolind Oil & Gas Co. in Midwest, Wyo., has been named district superintendent of the new Salt Creek district organization with offices in Midwest. **W. A. Van Hook, Jr.,** assistant field superintendent in the Salt Creek area, will succeed Graham as field superintendent. Graham has been at Salt Creek for 30 years, working for Midwest Refining Co. from 1921 to 1931 when it became a part of the Stanolind organization. He has been field superintendent since 1946. Van Hook first joined Stanolind in 1935 and has held various jobs in Stanolind's Central and Gulf Coast divisions. He was plant superintendent at Luby field in Texas for nearly 3 years, and more recently was field superintendent of Stanolind's Little Buffalo basin area, Big Horn basin.

*H. G. GRAHAM*

*VAN HOOK, JR.*

**A. B. Patterson,** formerly district geologist for Republic Natural Gas Co. at Corpus Christi, Tex., has resigned to assume a similar position in the newly created Corpus Christi

*TEXACO PRODUCTION COMMITTEE MEETS.—The producing committee of The Texas Co. at its recent meeting in New York City. Seated: C. B. Williams, H. H. Arnold, Jr., M. J. Heald, E. R. Filley, R. F. Baker, A. R. Wilson, J. N. Troxell, W. H. Farrand, R. L. Keyes, and W. V. Vietti. Standing: E. P. Hayes, W. I. Woodson, R. E. King, R. L. Lay, J. C. Brooks, G. M. Clement, J. D. Elson, Jr., W. C. Kneale, J. O. Bower, A. W. Baucum, T. T. Freeman, J. H. Puls, G. Herzog, W. J. Hanley, H. Brunjes, and A. C. Hunter.*



XUM

# PERSONALS

district office of **Ralph Lowe**, Midland, Tex., independent operator.

**Fenton H. Finn**, chief geologist of Consolidated Natural Gas Co. since 1943, has been elected a vice president of New York State Natural Gas Corp. He will continue as chief geologist, in addition to assuming duties of his new office.

**L. W. Elderkin**, former division production superintendent at Wichita Falls, Tex., for Shell Oil Co., has been appointed superintendent of the Delta district with headquarters at Harvey, La. Other changes include: **J. B. Dorr**, district geologist at Lake Charles, La., assigned to the New Orleans office as area geologist; **G. H. Samuels, Jr.**, district geophysicist at Baton Rouge, La., succeeds Dorr; **W. W. Ogden**, district seismologist at Calgary, Canada, succeeds Samuels; **G. D. Thomas**, district geologist at Shreveport, assigned to special problems with headquarters in Shreveport; **R. D. Menefee**, district geologist at Jackson, Miss., succeeds Thomas; and **R. W. Farlee**, geologist, succeeds Menefee; **J. E. Atkinson**, junior exploitation engineer, transferred from Houston to Donaldsonville, La., as exploitation engineer; **D. D. Bowling** and **J. R. Gross**, junior exploitation engineers, transferred to Franklin, La., as exploitation engineers; **L. P. Layman**, exploitation engineer, transferred from Franklin to New Orleans in the same capacity; **E. V. Pearson**, and **M. H. Standley**, junior exploitation engineers, transferred from Houston to Lake Charles, as exploitation engineers; **G. W. Burgess**, junior exploitation engineer, transferred from Houston to Kilgore, Tex., in the same capacity; and **F. W. Elton**, junior exploitation engineer, transferred to Corpus Christi.

**H. C. Cooke**, who formerly had consulting geological offices with **O. G. McClain**, Corpus Christi, Tex., has moved to Sterling, Colo., to become a consultant there.

**Freeman L. Orman**, geologist for Republic Natural Gas Co. at Dallas, has been transferred to Corpus Christi as district geologist.

**C. O. Fletcher**, geologist in the Beeville, Tex., district for United Gas Corp., has been transferred to the general office geological department in Shreveport. Other transfers include: **L. M. Kilgore**, oiler-engineer in the Dallas district, transferred to Beaumont, Tex., in a similar capacity; **G. L. Herrell**, geological scout at Shreveport, to the Jackson, Miss., district in a similar capacity; **E. F. Bean, Jr.**, assistant petroleum engineer, from Shreveport to the Beeville district in a similar capacity; **O. W. Lovell, Jr.**, junior assistant engineer, from Shreveport to the Jackson district as communications and corrosion technician; and **T. W. Scott**, junior draftsman in the Jackson district, to Shreveport as junior assistant engineer.

**F. C. Cutting**, formerly manager of the manufacturing - technological department, Shell Oil Co., New York, has been named assistant to the vice president of the economic development department. He is succeeded by **L. R. Goldsmith**, formerly superintendent at the Wilmington, Calif., refinery, and more recently engaged in the company's economic development department in New York.

**Dr. H. M. E. Schürmann**, head of the geological department of Bataafsche Petroleum Maatschappij, a branch of the Royal Dutch-Shell Group which is responsible for exploration, production, and refining, has resigned after 37 years of service. He joined the firm in 1913 as a geologist and was sent to Egypt. He was later transferred to Indonesia, then the Netherland Indies, where he filled various functions until the early part of 1930, when he was put in charge of the geological department at The Hague head office.

**G. C. Walker**, formerly manager of the alkylation department at Shell Oil Co.'s Wood River, Ill., refinery, has been appointed manager of the cracking department. He is succeeded by **G. A. Siegelman.**

**W. R. Balfour** has been named treasurer of Shell Development Co., Emeryville, Calif.

**Earl R. Downs**, district superintendent of the East Texas area at Henderson, Tex., for Ohio Oil Co., has been transferred to Orange, Tex., as superintendent of the South Louisiana district. Other changes include: **J. W. Gillespie**, transperred from Henderson to Haynesville, La., as district superintendent; **W. T. Kennedy**, district superintendent at Haynesville, transferred to the general office at Findlay, Ohio, as assistant to the general superintendent of production; **Lester Brown** has been named superintendent of the East Texas district; **H. D. Wood** and **Don O. McCarthy** named foremen in the East Texas district; and **J. S. Mathis** has been appointed superintendent of drilling tools and has been transferred from Orange, Tex., to Berwick, La.

**Andrew L. Person** and **Stanley Smith**, engineers for Fish Constructors, have transferred to the engineering staff of Transcontinental Gas Pipe Line Corp. at Newark, N. J., in connection with Transco's New England and Staten Island extensions.

**D. T. Rogers** has been appointed senior research associate of Standard Oil Development Co.'s research division.

# DEATHS

**E. K. Anderson**, 52, superintendent of refineries for Skelly Oil Co., died in Tulsa February 18. A native of Denver, Anderson joined Skelly in 1926. He served as operator of natural-gasoline plants in the Texas Panhandle, and later became district manager of gasoline plants. In 1941 he transferred to El Dorado, Kans., as refinery superintendent, and in 1946 was moved to Tulsa as manager of refineries

**Ben Earnest Lamb**, 78, pioneer wildcatter, died February 10 at Alpine, Ala. For many years he had worked with the field activities of Gulf Refining Co.

**Daniel M. Elkins**, 25, owner of Chem Oil Co., Mount Carmel, Ill., was killed in a collision February 13 near Nashville, Ill.

**Percy Jones**, 66, oil operator, died February 11 in Dallas.

**Mark Bolles**, 47, field engineer in southern Oklahoma for Tret-O-Lite Co., died February 17, in Duncan, Okla.

**Eugene Stebinger**, 67, retired chief geologist of Standard Oil Co. (N. J.), died February 8 in Portland, Ore. Stebinger joined Carter Oil Co. in 1920, and transferred to the parent company later that year. He retired from active service in 1945.

**Robert Crooks Stanley**, 74, chairman of the board of directors of International Nickel Co. of Canada, Ltd., died February 12 in New York.

**Ralph Dillenbeck**, independent Tulsa oil operator, died February 16 in Tulsa. He had been active in the oil business for the past 30 years.

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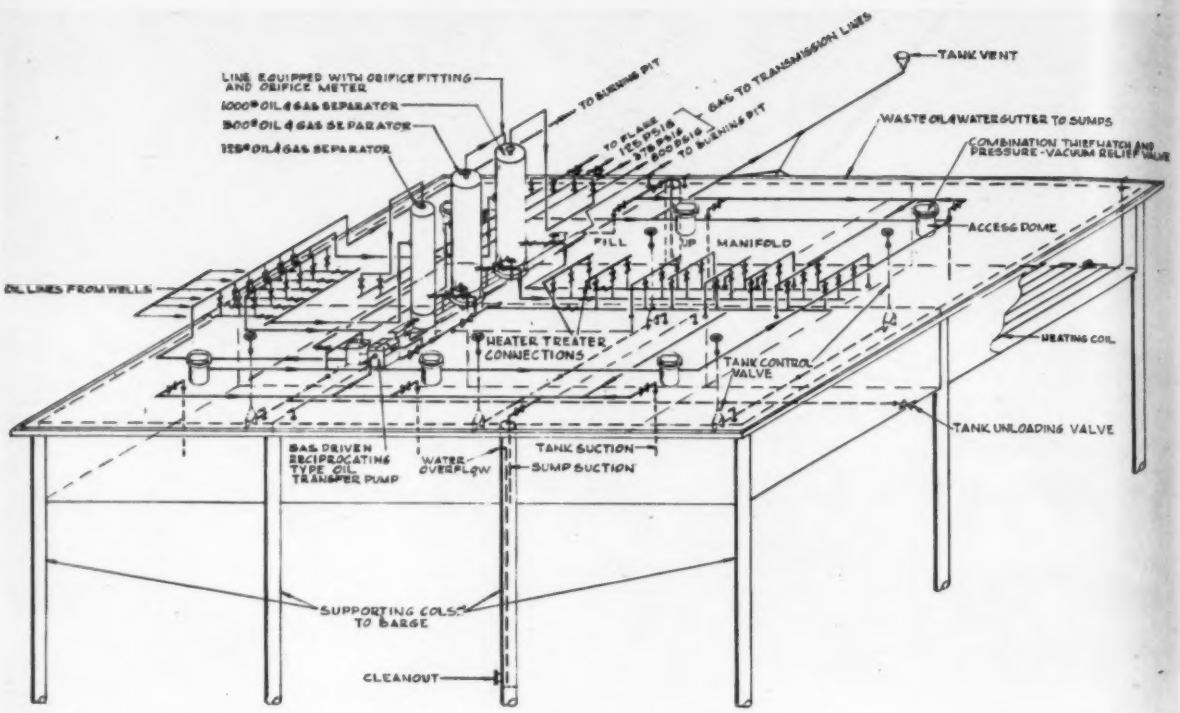



*Isometric drawing showing piping and other layout for Gulf Refining Co. submersible oil-storage tank battery in service in Black Bay, La.*

# Submersible Tank-Battery Barge Stores 4,800 Bbl. of Crude

## Here is described the first practical substitute for the customary piling-supported wooden platforms designed for interim oil storage

THE first submersible oil-storage tank-battery barge ever built is now in service for Gulf Refining Co. in Black Bay, La. It affords storage capacity for 4,800 bbl. of crude oil. It was commissioned December 6, 1950, in the Beaumont yard of Bethlehem Steel Co., and was designed and built at the yard by Bethlehem in close cooperation with Gulf Refining Co.

A long-felt need is filled by this type of barge in that it is the first practical substitute for the customary piling-supported wooden platforms erected to carry interim oil-storage tanks. It is of all-welded-steel construction, is leakproof and corrosion-proof, and is designed to withstand the severest action of wind and wave.

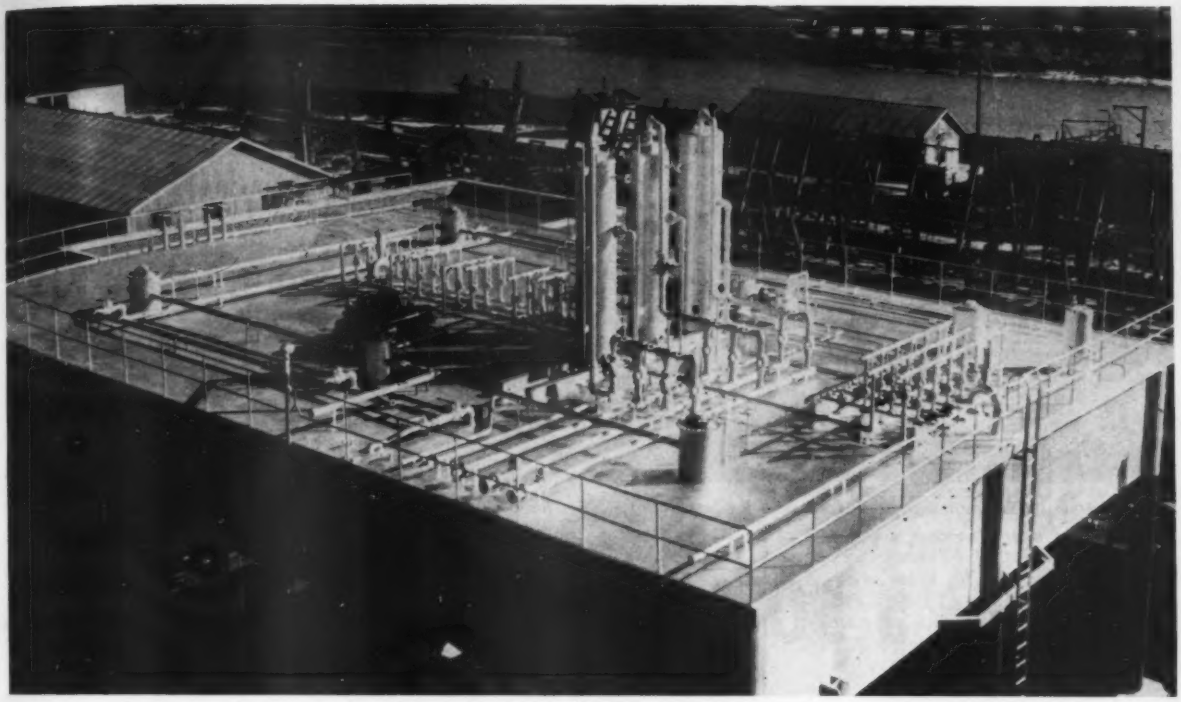
The barge carries on its topside deck all the necessary equipment in the way of pumps, oil and gas separators, etc., to make it a fully self-contained unit of oil-field equipment in the same way that the drilling barge and compressor barge are permanent equipment. The tank-battery barge has the great advantage of being easily moved as a unit to a new location, for it can be refloated in a couple of hours simply by blowing its four ballast tanks, using compressed air. It is then only necessary to tow the barge to its new position, sink it, and make the new line connections.

The barge is in two parts. The first part consists of a submersible float into which water is introduced through seacocks and which, when submerged, rests upon the floor of the bay as a kind of foundation for the storage tanks. Upon this float are erected 12 tubular-steel columns, each 20 in. in diameter. These columns support the second part of the barge, which is the oil-storage-tank superstructure with all of its topside oil and gas-handling equipment.

The float is 80 by 52 by 5 ft. It is divided into four water-tight compartments of equal size. When submerging, these compartments are flooded by means of a seachest with strainer, a 6-in. nonrising gate valve to control flooding of each compartment, and a 6-in. pickup line to each compartment. Extension rods lead from each gate valve to the deck, where hand wheels are provided. There is an access manhole and ladder to each ballast chamber.

To submerge, the forward ballast tanks are flooded first so that the float sinks endwise. The back tanks are then flooded and the float comes to rest gradually on the bottom. The procedure is reversed when refloating. All risk of capsizing is avoided by this method.

When refloating, air from portable



*Top-deck view of oil-storage tank battery. Oil and gas-handling equipment installed for Gulf Refining is shown.*

compressors located on the deck vents the water ballast through two of the center-line columns, which are provided with 6-in. goosenecks. These goosenecks may be removed if it is desired to fill the tank by hose, and each has an air hose fitting on a bolted flange for blowing the tanks.

The float is constructed of $\frac{5}{16}$-in. steel plate on bottom, top, sides, and ends. The longitudinal water-tight bulkhead is also of $\frac{5}{16}$-in. plate. Quarter-inch plate is used for the transverse bulkhead and the swash bulkheads. The float is designed to resist water pressure up to 13-ft. head, internal air pressure of 5 psig., and bottom pressure of 500 lb. per sq. ft.

Of the 12 columns, the 2 centermost are fabricated of ½-in. steel plate, the others of $\frac{3}{8}$-in. plate. Their upper and lower ends are built into the oil-storage-tank superstructure and the float barge, respectively.

The oil-storage-tank structure consists of $\frac{5}{16}$-in. steel bottom plate and ¼-in. steel plate top, sides, and internal dividing bulkheads, the whole supported and stiffened so that the six compartments into which it is divided will adequately contain 4,800 bbl. of crude oil—800 bbl. to each tank. Outside dimensions of this superstructure are 72 by 48 by 8 ft. Access to each oil tank is through a 3-ft.-diameter by 2-ft. 6-in.-high expansion dome on the deck, each dome being fitted with a combination pressure, vacuum relief valve and thief hatch, and a vertical ladder leading down into the tank.

When the float barge is submerged it will rest upon the bay floor at a depth not exceeding 12 ft. The bottom of the storage tank will be approximately 12 ft. above the water and the oil will be run by gravity through hoses into transportation barges.

When the unit is on location it is anchored in place by means of four spuds, one at each corner. These spuds are made of 35-ft. lengths of 10-in. wide-flange 60-lb. steel sections, each operating in a cage. Each is equipped with a 5-ton-capacity hand-operated winch run with 30 ft. of ½-in. stainless-steel wire rope for the purpose of retracting the spud when it is desired to move the barge. The upper 15 ft. of each spud is equipped with flat steel lugs on the web to engage a jack for breaking loose from the bottom.

### Handling Equipment

On the topside deck the oil and gas-handling equipment furnished by the customer, Gulf Refining Co., is located. Included are one 7 by 4½ by 10 oil pump capable of operating under 200 psig. of gas pressure; one vertical oil and gas separator for 125 lb. working pressure, 3 by 13 ft., with all necessary controls; one vertical oil and gas separator for 500 lb. working pressure, 2 ft. 6 in. by 12 ft. 6 in., with all controls; and one vertical oil and gas separator for 1,000 lb. working pressure, 2 ft. 6 in. by 12 ft. 6 in., with all controls.

All deck piping, valves, bypasses, etc., were furnished by Gulf Refining and installed to its specifications. The accompanying flow diagram shows how the oil and gas are routed.

Bethlehem provided a 2½-in. suction line from a 4-in. pump suction header to each of two sumps, installed in a 20-in. column on each side of the barge. These sumps catch the deck drainage channeled to them by a deep gutter surrounding the entire deck. They are fitted to act as oil and water separators, with overflow piping installed to vent the water and pump lines from recovering the oil.

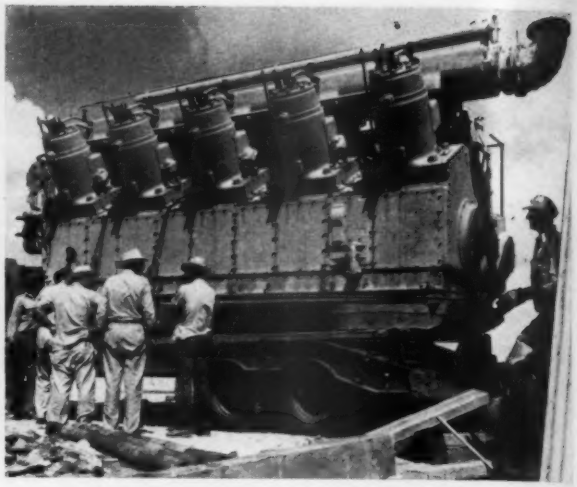
Steaming coils of the hairpin type were also provided in each of the six storage tanks, approximately 270 lineal feet of 1-in. extra-heavy seamless steel pipe being bolted to the tank bottoms. Deck connections were provided to each.

A platform is provided at one end of the barge slightly above water level to which a railed stairway gives access. Here is located the oil-tank drainage valve. There is also a ladder from the deck to the barge deck attached to the other end of the barge. The entire top deck is enclosed with a substantial railing.

One of the important functions performed by the barge is insuring that oil does not reach the water of the bay. Since it is said by the Fish and Game Commission that slicks on the water caused by spilled oil kill sea life, and since the consequences of permitting a slick to form are drastic fines and other penalties, the nonleaking feature of the new barge promises to be a great benefit to oil men and sportsmen alike.

Beaumont yard is already at work on additional oil-storage tank-battery barges, for Atlantic Refining Co.

*Removed from its foundations and skidded onto lowboy trailer...*



*This 1,200-hp. unit was moved to new location 91 miles away...*

# Moving a 50-Ton Compressor 91 Miles

MOVING a 1,200-hp. compressor weighing approximately 100,000 lb. for a distance of 91 miles is something which does not occur every day even in Southwest Texas where long hauls are not unusual. Such a feat was recently accomplished by Heard & Heard, oil-field haulers, which transported the above-mentioned compressor from Kelsey field in southwest Brooks County to Willamar field in Willacy County. A special permit from the Texas Highway Commission was necessary before the haul could be made.

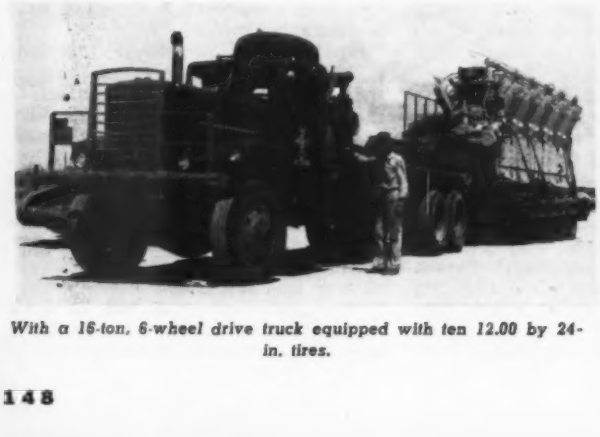
The compressor moved was one of four at the Kelsey gas plant which was completed by Humble Oil & Refining Co. less than 1 year ago. The move was decided upon in compliance with a directive from the Texas Railroad Commission requiring additional flaring facilities at Willamar field, and a time limit of October 1 had been set.

Willamar field has been under fire from the Texas Railroad Commission recently for excessive flaring of gas, and its producing days were this month slashed to 10 because of lack of flaring facilities. Jack Baumel, Texas Railroad Commission chief engineer last month indicated such a cut might be made in order to hold gas output to a volume which could satisfactorily be handled by compressor units now operating in the field. With the installation of the above 1,200-hp. unit, production increases are expected to be allowed, and the plant to be in working order very shortly.

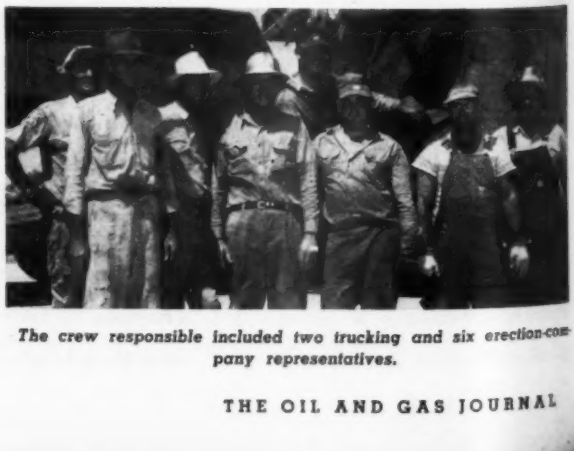
As shown in the accompanying picture, the compressor was securely bolted to its concrete foundation. Milton Clarkson, camp superintendent for Heard & Heard with office in Falfurrias, explained that this particular type compressor was not usually moved after once being installed. One section of the wall of the building which housed the unit had to be removed before it could be loaded onto the truck. Jimmy Pistole of Stearns-Roger Manufacturing Co., Denver, was in charge of taking the compressor down and installing it in the Willamar plant.

Dislodged from its foundation, the compressor was raised by a number of heavy-duty jacks, lifted, and bolted to heavy timber skids. Timbers were then built up to form a runway to the 16-ton Oshkosh all-wheel-drive truck. The truck's 12.00 by 24-in. tires (10 in all) differ from the usual type in that all 6 wheels drive. This makes for better hauling through sand, explained George Busby, Heard & Heard truck foreman. Rollers were placed between the skids and foundation, a double round of 1⅛-in. cable secured the compressor, and the 100,000-lb. unit was winched onto the lowboy gooseneck 16-tire truck trailer.

Because of its excessive size and weight a daylight haul was necessary. The unit was delivered to its destination the day following its loading, and installation proceedings got under way immediately.



*With a 16-ton, 6-wheel drive truck equipped with ten 12.00 by 24-in. tires.*



*The crew responsible included two trucking and six erection-company representatives.*

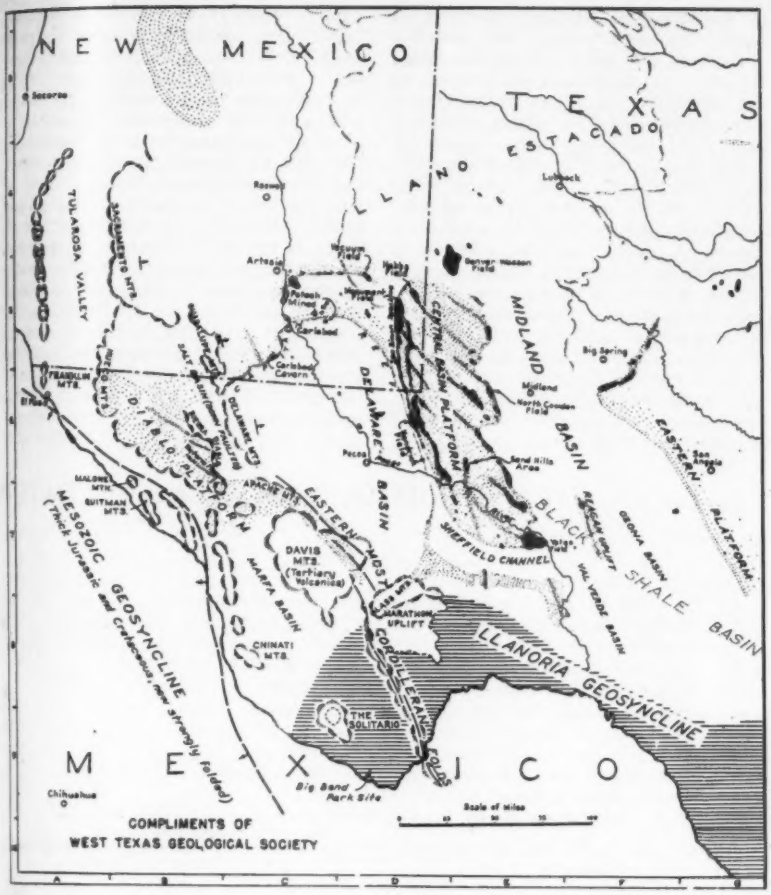



*Fig. 1—Map showing location of Delaware basin with respect to other geologic features of West Texas.*

**THE AUTHOR**

**Berte R. Haigh has been supervising geologist for University Lands since September 1936, after first becoming associated with that organization in October 1934 as geologist. He received his college training at Texas College of Mines (now Texas Western College), graduating in 1925 with the degree of bachelor of science in mining engineering. Haigh returned to Texas College of Mines in September 1928 as assistant professor of geology and engineering, and remained until October 1934 when he went with University Lands. From March 1926 to September 1928 he was employed with Dixie Oil Co., Inc., at San Angelo, Tex.**

# Geology of Delaware Basin

**by Berte R. Haigh**

THE Delaware basin of West Texas and southeastern New Mexico is a rather extensive geologic province, shaped somewhat like a hammer, with a major axis approximately 150 miles in length, a minor-axis distance of some 70 miles, and an areal extent of over 10,000 sq. miles. The major axis has a general northwest-southeast trend and that of the minor axis is east-west. A generalized description of the boundaries of the Delaware basin (see Fig. 1) would be as follows: on the east by the Central Basin platform; on the north by the "buried" Capitan reef; on the northwest by the Guadalupe Mountains and the uplifted portion of the Capitan reef; on the west by the down-faulted Salt Flat area, on the southwest and south by the Apache Mountain reef area and Davis Mountain syncline; and on the southeast by the Glass Mountain area and the Sheffield Channel.

There are several indications, however, that the boundaries as listed above may not be, except on the east, the true limits of the extent of this vast basin. In the Carlsbad area wells have been drilled which indicate that possibly the Delaware basin extended under at least a part of the Carlsbad Shelf. Three of these wells are: Standard Oil Co. of Texas 1 Wilson, 3-22s-25e, in which reef material was encountered at +3,385 ft. and Delaware sand at +1,517 ft.; Standard of Texas 1 Smith, 23-22s-24e, which started in the reef at a surface elevation of +4,272 ft. and entered Delaware sand at +2,800 ft.; and Getty 7 Dooley, 24-20s-29e, which passed out of a salt section at +2,339 ft. entered reef material at +2,290 ft. and Delaware sand at —456 ft. The Lamar lime was absent in all three of these wells.

A thin section of typical lower Delaware Mountain sediments is present on Apache Peak (at the north end of the Sierra Diablo Mountains); three or four low buttes on the eastern edge of the Diablo Plateau (on west rim of Salt Flat) are composed of lower Delaware; and, exposures of middle Guadalupian series are found on the west flank of the southern end of the Guadalupe Mountains. These exposures indicate that at least a part of the down-faulted Salt Flat may have been a part of the basin. Certainly the badly faulted area

between Salt Flat and the Delaware Mountain escarpment was once within the basin area, geologically speaking.

Topography of the basin area ranges from the rugged, stream-cut terrain of the Delaware Mountain and trans-Pecos regions, to the monotonously flat terrain of Loving and Ward counties east of the Pecos. Mappable surface outcrops are limited to approximately the western two-thirds of the trans-Pecos portion of the basin. Because of "slump" created probably by solutioning in the Castile evaporite section, and also because of many faults, a large number of which are indicated on the surface only by "traces" (usually aragonite veins) and are of unknown "throw," mapping on any surface outcrop other than a known marker in the Delaware Mountain group itself can be exceedingly tricky and has produced some expensive erroneous interpretations.

### Structure

Structurally the Delaware basin reminds one somewhat of a gigantic irregular shaped saucer tipped to the east, with the elevation of its present western rim being in excess of 5,000 ft. above sea level while the eastern rim ranges between 2,200 and 2,400 ft. subsea, with limited warping or crumpling and, with the possible exception of Lion field in Ward County, no anticlinal structures as yet discovered in the entire Delaware basin area. The writer considers Lion field to be a terrace-type trap.

Fig. 3 is a map of the basin contoured on the top of the Lamar lime with a 500-ft. contour interval. Although this interval may be a bit wide spaced I can find no structural evidence to warrant a closer spacing for the purpose of this paper and the contours shown do represent the general structural picture rather well. Structurally, the basin is an east-dipping monocline, with the general dip interrupted by infrequent terraces. The maximum known "updip" reversal on these terraces will not exceed 20-25 ft. in Delaware section.

There is enough evidence to give considerable weight to a theory that this basin existed as such, with variations as to size and depth, from the beginning of Pennsylvanian (and possibly Mississippian) time through the end of Permian time. However, the pre-Permian evidence is not of sufficient scope to justify this paper making more than a brief mention of it. It is not expected that structural conditions of the pre-Permian-post-Devonian basin will vary greatly from those found in the Permian.

Table 1 lists the sea-level datum points at which the tops of the various formations were encountered in important wells drilled within the area under discussion. All of these wells penetrated pre-Delaware Mountain

## TABLE 1—PLUS OR MINUS SEA-LEVEL DATUM

| Map symbol | Operator, well, and location— | Elev. |
|---|---|---|
| A | Standard of Texas 1 Wilson, Eddy County, New Mexico | 3,737 |
| B | Standard of Texas 1 Smith, Eddy County, New Mexico | 4,272 |
| C | Getty 7 Dooley, Eddy County, New Mexico | 3,309 |
| D | Humble 1 Federal-Wiggs, Eddy County, New Mexico | 3,460 |
| E | Gulf 1 Grisham-Hunter, Culberson County, Texas | 5,696 |
| F | Gulf F-1 Grisham-Hunter, Culberson County, Texas | 3,597 |
| G | Pure 1 Quaid, Culberson County, Texas | 3,988 |
| H | Pure 1 E. Hunter, Culberson County, Texas | 5,308 |
| I | Anderson-Prichard 1 Borders, Culberson County, Texas | 4,565 |
| J | Argo 1 Roberts, Reeves County, Texas | 2,880 |
| K | Argo 1 Ikins et al, Reeves County, Texas | 2,930 |

*Lamar lime (upper member of Delaware) not present. †Formation not recognized.

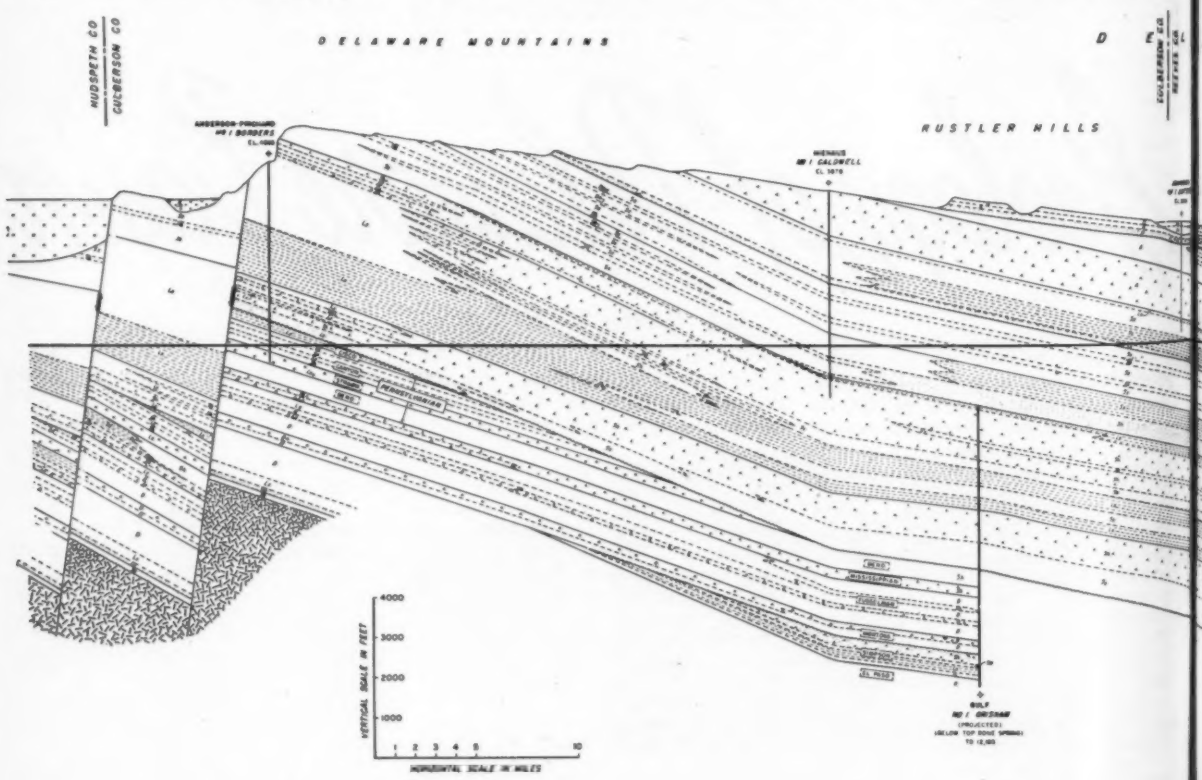



*Fig. 2—Portion of cross-section for West Texas showing relation of Delaware basin to Central Basin platform on east (right) and Delaware Mountains on west.*

formations. They are shown on the contour map (Fig. 3) by letters "A" through "K."

No recognizable Silurian was present in the Humble Oil & Refining Co. 1 Federal-Wiggs (Key Well D). The very considerable divergence between the top of the Bone Springs (Leonard) and the top of the El Paso (Ellenburger) evidenced in the Gulf Oil Corp. 1 Grisham-Hunter (Key Well E) and the Gulf F-1 Grisham-Hunter (Key Well F), only 26 miles apart, deserves comment. The dips between these two wells on the tops of the encountered formations are: 6,439 ft. on the Bone Springs, 7,789 ft. on the Woodford, 7,740 ft. on the Devonian, 7,806 ft. on the Silurian, 7,867 ft. on the Montoya, 7,871 ft. on the Simpson, and 8,172 ft. on the El Paso. We thus find a total section thickening of 1,733 ft., of which 1,350 ft. occurs between the top of the Bone Springs (base of Delaware Mountain group) and the Woodford and only 383 ft. between the top of the Woodford and the El Paso. The author considers this as good evidence that the Delaware basin, as a basin structure, is post-Woodford in age.

Pure Oil Co. 1 Eloise Hunter (Key Well H) and Anderson-Prichard Oil Corp. 1 Borders (Key Well I) are west of the present basin rim and are cited principally for the reason that they indicate the original basin to have extended westward beyond its present defined boundary.

Argo 1 Roberts (Key Well J) was the only one of these "pre-Delaware" wildcats to encounter production. It was completed as a Wolfcamp producer with an initial production of 71 bbl. of oil daily plus 10 per cent water. It is reported that the well has now gone off production. Efforts to make a producer of Argo 1 Ikins et al., (Key Well K), a mile to the southwest with limited structural difference, did not avail.

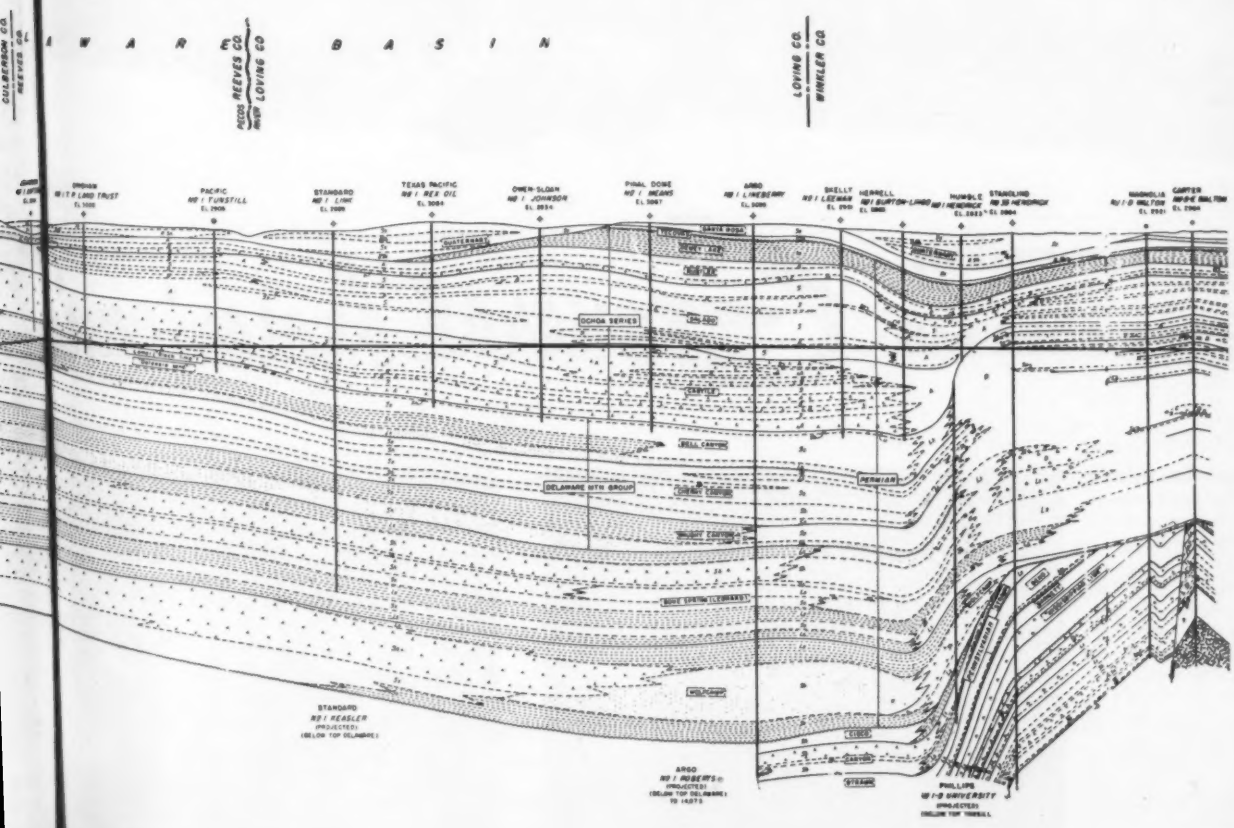
It is thus seen that only relatively few wells have tested the section below the base of the Delaware Mountain group and these were too widely separated to give but little or no structural evidence. However, although this deep-well drilling in the Delaware basin area has not as yet produced favorable results, the author is of the opinion that pre-Pennsylvanian structures do exist and that they will pay off. They will, however,

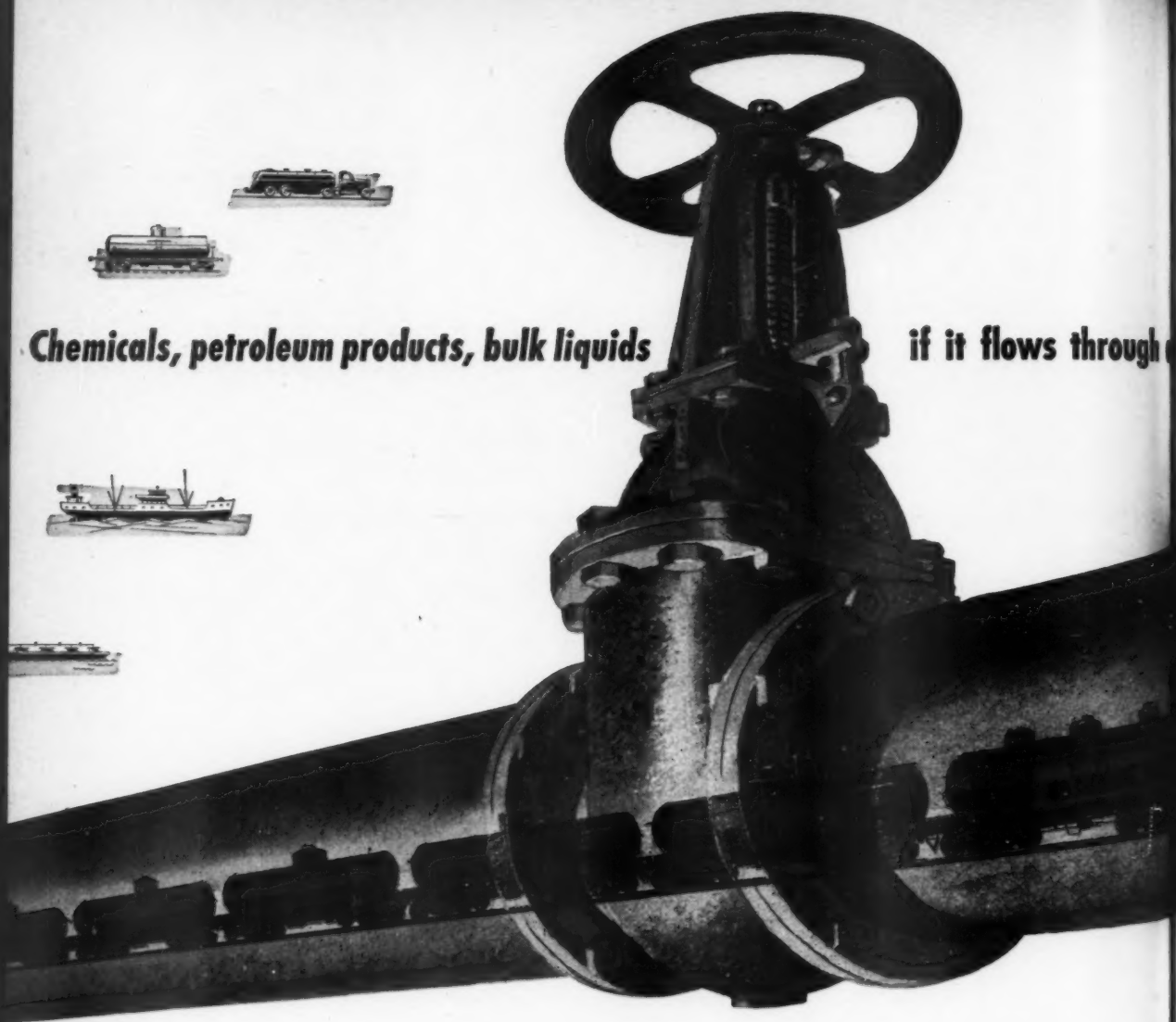
## POINTS OF FORMATION TOPS RECORDED FOR KEY WELLS REFERRED TO IN TEXT

Sea-level datum for top of formations

| Elev. | Reef lime | Delaware lime | Bone Spring | Wolf-camp | Penn-sylvanian | Mis-sissippian | Wood-ford | Devonian | Silurian | Montoya | Simpson | El Paso (Ellen-burger) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3,727 | +3,385 | +1,517 sand* | .... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 4,272 | Surface | +280 sand* | .... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 3,309 | +2,290 | —456 sand* | .... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 3,460 | ..... | +1,220 | —2,280 | —6,260 | —7,330 | —9,010 | (‡) | —9,695 | N.R.† | —10,810 | —11,050 | —11,218 |
| 5,896 | ..... | Surface | +4,916 | N.R.† | +1,961 | N.R.† | +1,576 | +1,436 | +1,153 | +454 | +113 | —111 |
| 3,267 | ..... | +1,637 | —1,523 | —4,103 | N.R.† | N.R.† | —6,213 | —6,304 chert | —6,653 | —7,413 | —7,758 | —8,283 |
| 3,988 | ..... | Surface | +532 | Bottomed in Bone Spring at 5,006 | | | | | | | | |
| 5,308 | ..... | ..... | Surface | N.R.† | N.R.† | +833 | +128 | +33 | —115 | —927 | —1,032 | —1,284 |
| 4,365 | ..... | ..... | Surface | +1,565 | +545 Cisco | Bottomed in Pennsylvanian (Des Moines) at 5,001 or —436 | | | | | | |
| 2,880 | ..... | —2,267 | —4,960 | —6,930 | —9,855 | Bottomed in Pennsylvanian (Age?) at 14,073 or —11,193 | | | | | | |
| 2,930 | ..... | —2,234 | —4,910 | —6,890 | Bottomed in Wolfcamp at 11,250 or —8,320 | | | | | | | |

*Woodford not recorded.





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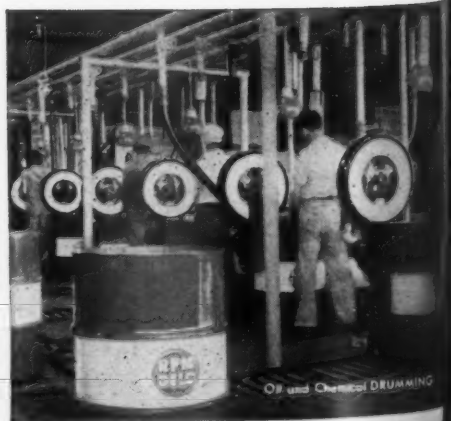
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vary greatly from the terrace-type structures found to date in the Delaware formation. They may cover only small areas but will have anticlinal characteristics with considerable structural relief. The problem is to find them.

### Stratigraphy

Fig. 2 is a reproduction of the Delaware basin portion of the West Texas Geological Society's west-east cross-section (1949 edition) and is used here to show both the general structural features and the discussed stratigraphic section.

The post-Leonard geologic section of the basin area consists of the Delaware Mountain group (Brushy Canyon, Cherry Canyon, Bell Canyon), the Ochoa series which takes in the Castile, Salado, Rustler, Dewey Lake, and Tecovas formations, the Santa Rosa and the Quaternary.

The Delaware Mountain group consists of a series of thick sand beds with thinner shale and limestone partings. The total thickness of the Delaware Mountain group ranges between 2,100 and 3,500 ft. The uppermost member of this group is the Lamar limestone, a very persistant black lime having a thickness range of from 18 to 35 ft. It is present over almost the entire basin area.

The Ochoa series is, from the base of the Castile to the base of the Rustler dolomite, composed almost entirely of evaporites. This evaporite section, consisting of salts, anhydrites, gypsums, and limes in beds of varying thickness (from a fraction of an

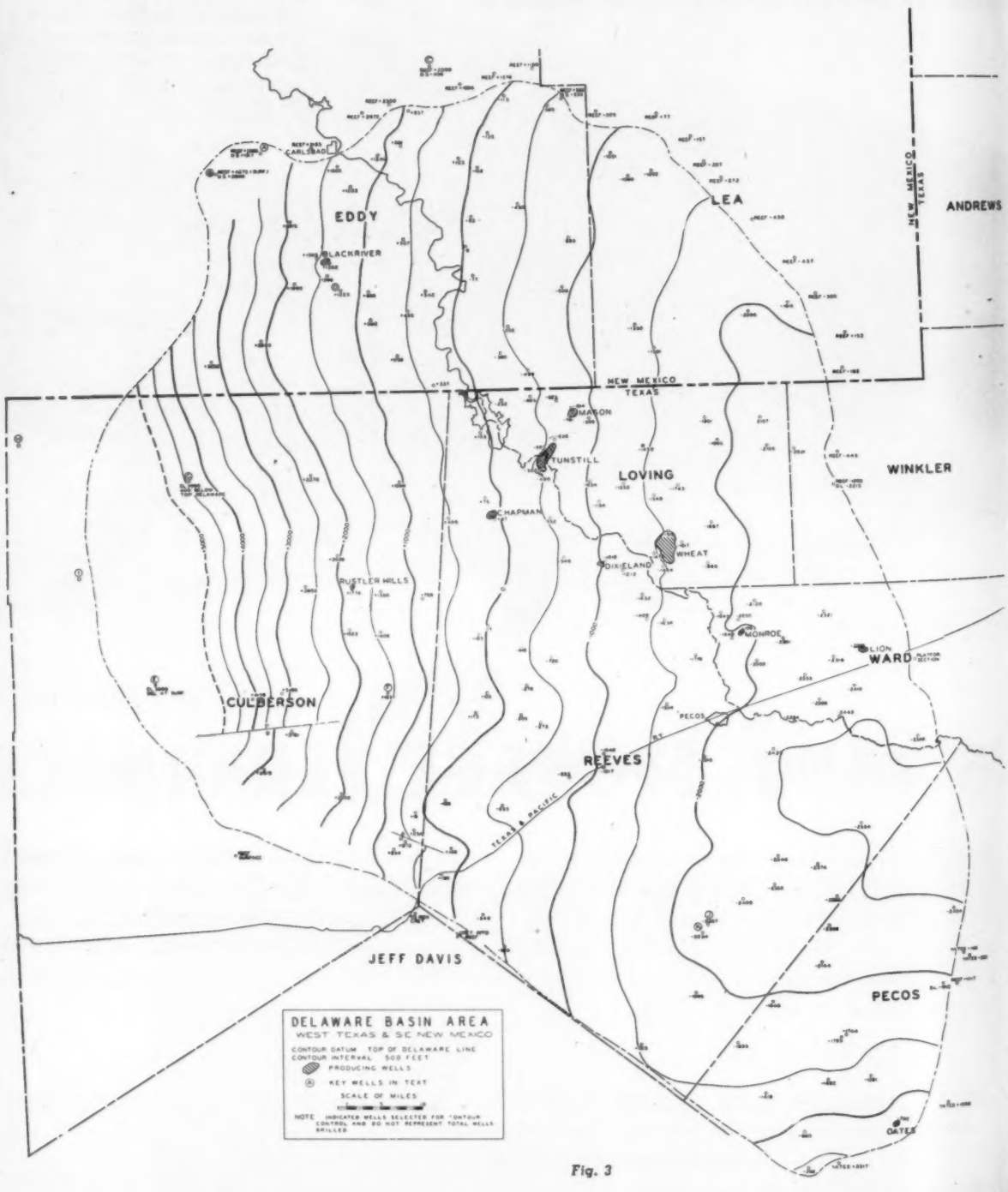


Fig. 3

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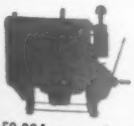

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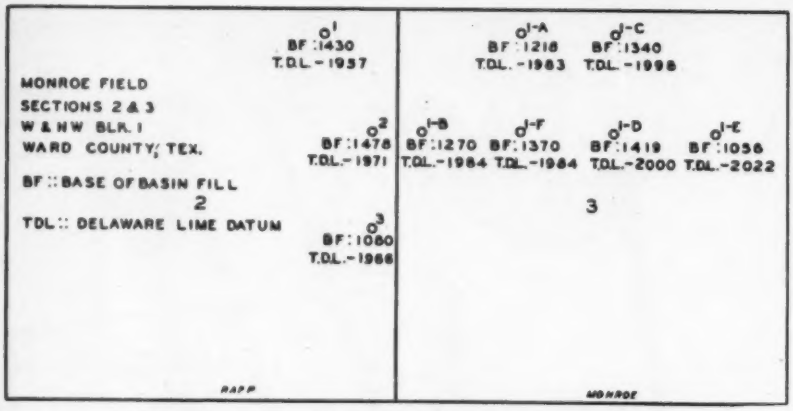


*Fig. 4—Location map of Monroe field, Ward County, Texas.*

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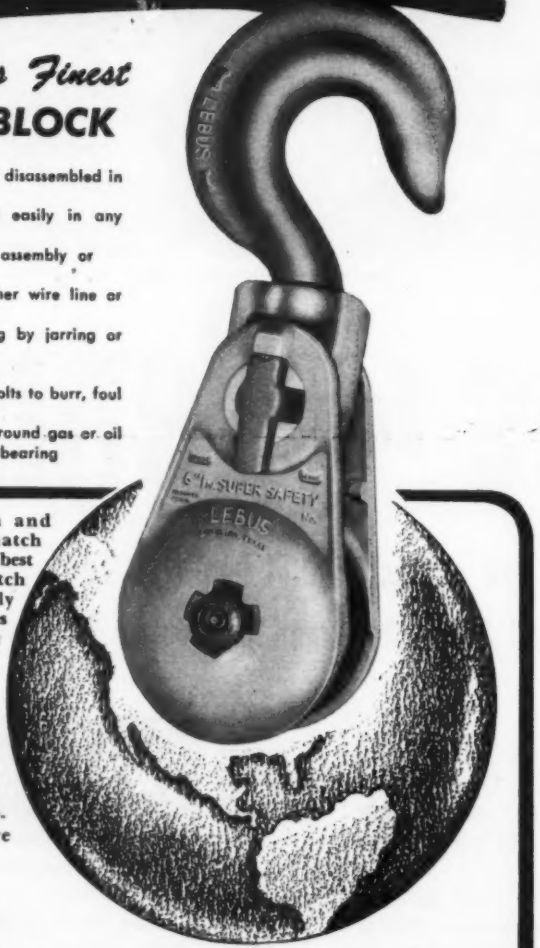


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inch to hundreds of feet) has a thickness ranging from zero in the Delaware Mountain area to 3,500 ft. in the deeper basin areas. The Rustler is an anhydrite, limestone, dolomite series ranging in thickness from a few feet in the Delaware Mountain area to approximately 250 ft. in Ward County. The Dewey Lake and Tecovas formations are relatively minor in importance and are present in a small per cent of the basin area, principally the northern deeper part.

The Santa Rosa (Triassic) is likewise present over only a small portion of the basin and is relatively thin.

Quaternary sands and gravels are present over a major portion of the area with a wide variation in thickness. These thickness variations are quite pronounced and occur within very short distances. One striking example of this occurs in Monroe field of western Ward County, attention is called to this because it may have considerable bearing on the geophysical problems.

Fig. 4 is a location map of Monroe field, located in the southwest corner of W&NW Block 1 in Ward County. Here are nine producing wells within an area of approximately 440 acres and a basin-fill thickness variation of 420 ft. This maximum variation occurs between the 2 Rapp and the 1-E Monroe, a distance of 4,600 ft. It will be noted that in the same wells the difference in Delaware lime datum is only 51 ft. Between the 1 Rapp and the 1-B Monroe, a distance of 660 ft., is a basin-fill variation of 208 ft. with a Delaware lime datum difference of only 13 ft. Between the 2 Rapp and the 3 Rapp, a distance of 1,320 ft., there is a basin-fill difference of 398 ft. and a Delaware lime datum difference of only 15 ft. It is quite probable that this feature creates considerable difficulty in geophysical interpretations.

### Production

Commercial production within the basin area is presently, with a few exceptions, limited to terrace-type traps at the base of the Lamar limestone, which is the uppermost member of what is generally known as the Delaware formation.

Practically the entire Permian section above the Lamar limestone is composed of sediments that are principally an evaporite type, with limited chance of reservoir conditions or commercial production. Over a considerable portion of the trans-Pecos part of the basin at least, some considerable thickness of the lower Castile is composed of laminated lime and anhydrite or gypsum with the lime stringers being quite bituminus in character. In fact some of the early day explorers in the area called it "stink rock." This was probably the source of the oil that was found in teasing quantities in several of the early-day wells. One or two of these

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wells were actually of a commercial size—for a day or two.

Also a dozen or so shallow wells were drilled, some 30 years ago, approximately 12 miles north of Toyah which, from a depth of approximately 80 ft., produced a crude that had no gasoline but did have a good kerosine and lube base content. These wells were abandoned, however, during the early 1920's and, as stated, practically all other production from the Delaware basin is found at the base of the Lamar lime.

### Oil Fields of the Area

The better-known Texas fields that are producing from these terrace-type traps are Mason and Wheat fields in Loving County, Tunstill field in Loving and Reeves counties, Dixieland and Chapman fields in Reeves County, and Monroe and Lion fields in Ward County, plus a few producing areas with only one or two wells. In New Mexico the principal producing area is Black River field. Two of the exceptions referred to having pre-Delaware sand production are Oates field in southwest Pecos County and Rustler Hills field in Culberson County, both of which produce rather low-gravity crude of minor importance from the Rustler lime section.

In connection with the terrace traps referred to, it has been noticed from an examination of samples from several wells that apparently the pay sand is coarser and less consolidated than is the texture of "typical" Delaware sand. Maybe these pay zones constituted lenses of coarser shore-line sand that were present when the Lamar lime was deposited and thus account for the terrace-like interruption in the otherwise relatively uniform monoclinal dip of the lime surface. That is not handed out as a developed theory, but as a bone thrown out to be chewed on.

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Many geologists have observed the very rapid gradation that takes place at the entrance to McKittrick Canyon, on the east flank of the Gaudalupe Mountains, where the Delaware Mountain formations merge into the Capitan reef. At this point both the Lamar limestone and typical Delaware sand grade into reef limestone in less than 400 yards lateral distance. It is thought by several geologists that the same condition should exist on the eastern rim of the basin where the Delaware basin formations grade into the limestones and dolomites of the Central Basin platform and that if such a gradation zone can be located the chances of an excellent stratigraphic-type trap being present are of a high magnitude. That appears to me to be a very likely place for a good oil field.

### Conclusions

This paper will be probably of limited assistance in finding oil in the Delaware basin. Surface mapping has not proven at all reliable. Various and sundry theories, such as the subsidence theory (by which Wheat field was accidentally discovered), relation of topography to subsurface, etc., have not, in my opinion, paid off. It is true that production has been secured in the basin when such theories were followed but, at the same time, all of these methods have so many dry-hole records that I believe the discoveries were coincidental.

In view of the complete lack of reliable mappable surface outcrops, the sparcity of pre-Pennsylvanian subsurface data, the apparent failure of such theories as subsidence (due to a solutioning out of the salt and other evaporites over the buried structural highs), topographic reflection of subsurface structures, etc., and the, up to now, serious difficulties in obtaining satisfactory geophysical data, I am hesitant about offering a great deal of hope that, until more subsurface data are available, geology will be of much help unless it be of the Ira Cram visualization type. *(See The Oil and Gas Journal, December 14, 1950, page 97.)* The author believes that this method, sensibly applied and well backed financially, will eventually pay off, although it is probable that many more dry holes will be drilled in the attempt.


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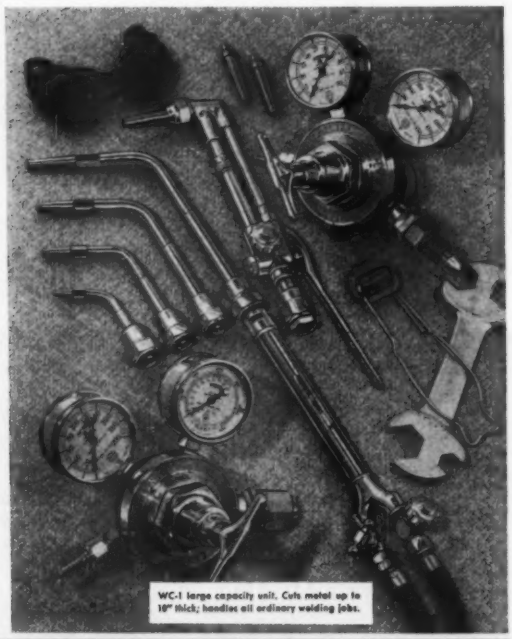

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## *They learned that capacitors can (1) increase voltage, (2) reduce effective load, and (3) reduce system losses*

**by W. B. Helms* and W. R. Horrigan†**

THE writers of this paper were approached in June 1949 by various men in the oil industry around Borger and Sunray, Tex., with the following problems:

1. How to correct secondary low voltages on oil leases which was causing motor burnouts.
2. How to release capacity of transformer banks.
3. How to reduce copper losses.

These requests started the studies resulting in this paper. A check was made of existing data. Substantial data could be found on the application of low-voltage capacitors to constant-loaded motors, but the data on capacitors for variable loaded motors were rather vague. More than a year was spent in testing over 30 pumping units to secure the data given in this report, and during this period about 15 engineers took part in these tests.

*Southwestern Public Service Co. †C. B. Anderson Co. Paper presented at fall general meeting, A.I.E.E., Oklahoma City.

### Power Factor and Capacitors

Previous treatments of the application of capacitors to oil-field pumping loads have attacked the problem from a standpoint of correcting the power factor. The power factor of a load is defined as the true power (kw.) divided by the apparent power (kva.), but in the case of a cyclic oil field pumping load average values are desirable and the power factor would be kwh./kvah. Since both factors are variable, it is not only difficult to determine the power factor but it is also difficult to apply it once it is determined. There is a possibility that the cart is being put before the horse by working with the power factor of the cyclic load when the power factor has a real value of its own only when a power factor clause is included in the power contract.

Individuals, corporations, and companies spend money only in the hope of getting money in return (by interest, capital gain). The installation of capacitors require the expenditure of money, and the purchaser, therefore, wishes to know when and how this money will be returned. The only ways for a return to be made on this investment when no power factor clause is included in the contract is: (1) a reduction of power consumed; (2) reduction of maintenance cost; (3) when the expenditure of a sum for capacitors will decrease the necessary expense for increased capacity.

**Power consumption.** — Considering the first item of reducing purchased power; that part of the power purchased for an oil lease which does work, i.e., supply the pumping load, cannot be reduced directly by introducing capacitors. Only the system losses are effected directly. The system losses are nearly all $I^2R$ losses. To reduce these losses we are interested primarily in the effect on the current produced by the capacitors. The fact that the power factor is altered is incidental.

Since the resistance of a system is more or less readily determined by a standard engineering calculation, the problem is to determine just what effective current is imposed on the system by an oil-field pumping load and how that current and the consequent losses vary with the installation of capacitors.

**Maintenance cost.**—In considering Item 2, reduction of maintenance costs, the primary influence that may be expected from capacitors installation on maintenance costs are the improvement of voltage and consequent increase in motor life and the reduction of effective load on the system equipment. The motor voltage is a function of the impedence drop (IZ). The load on the system equipment is a function of the voltage and current (EI). Once again attention is directed to the fact that power factor

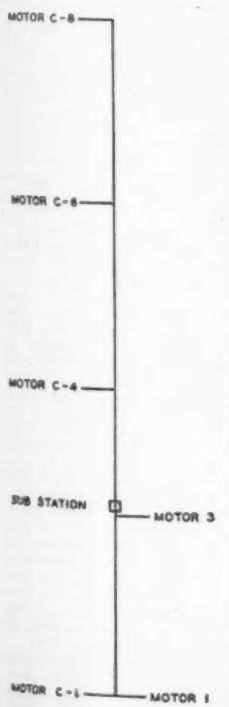
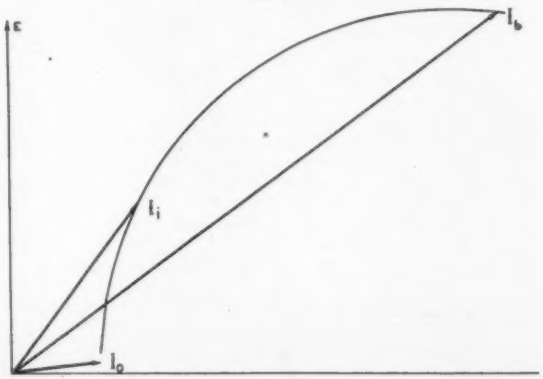



*Fig. 1—(Left) Location of motors in lease under test. All secondary No. 4 copper 3-15-kva. transformers.*

**MOTOR DATA**

| | C-1 | All others |
|---|---|---|
| Location | | |
| Horsepower | 10 | 10 |
| Starting torque | Normal | High |
| Full load, r.p.m. | 1,160 | 1,170 |
| Voltage | 440/220 | 440/220 |
| Amperes full load | 27.4/13.7 | 28/14 |
| Phase | 3 | 3 |
| Cycles | 60 | 60 |

*Fig. 2—(Below) Circle diagram of an oil-field-type induction motor.*



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### Conclusions

This paper will be probably of limited assistance in finding oil in the Delaware basin. Surface mapping has not proven at all reliable. Various and sundry theories, such as the subsidence theory (by which Wheat field was accidentally discovered), relation of topography to subsurface, etc., have not, in my opinion, paid off. It is true that production has been secured in the basin when such theories were followed but, at the same time, all of these methods have so many dry-hole records that I believe the discoveries were coincidental.

In view of the complete lack of reliable mappable surface outcrops, the sparcity of pre-Pennsylvanian subsurface data, the apparent failure of such theories as subsidence (due to a solutioning out of the salt and other evaporites over the buried structural highs), topographic reflection of subsurface structures, etc., and the, up to now, serious difficulties in obtaining satisfactory geophysical data, I am hesitant about offering a great deal of hope that, until more subsurface data are available, geology will be of much help unless it be of the Ira Cram visualization type. *(See The Oil and Gas Journal, December 14, 1950, page 97.)* The author believes that this method, sensibly applied and well backed financially, will eventually pay off, although it is probable that many more dry holes will be drilled in the attempt.


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Here are reported the results of a year's study by 15 engineers, who tested 30 pumping units during the course of an extensive investigation on

# CAPACITORS IN OIL-FIELD PUMPING

## *They learned that capacitors can (1) increase voltage, (2) reduce effective load, and (3) reduce system losses*

**by W. B. Helms* and W. R. Horrigan†**

THE writers of this paper were approached in June 1949 by various men in the oil industry around Borger and Sunray, Tex., with the following problems:

1. How to correct secondary low voltages on oil leases which was causing motor burnouts.
2. How to release capacity of transformer banks.
3. How to reduce copper losses.

These requests started the studies resulting in this paper. A check was made of existing data. Substantial data could be found on the application of low-voltage capacitors to constant-loaded motors, but the data on capacitors for variable loaded motors were rather vague. More than a year was spent in testing over 30 pumping units to secure the data given in this report, and during this period about 15 engineers took part in these tests.

*Southwestern Public Service Co. †C. B. Anderson Co. Paper presented at fall general meeting, A.I.E.E., Oklahoma City,

### Power Factor and Capacitors

Previous treatments of the application of capacitors to oil-field pumping loads have attacked the problem from a standpoint of correcting the power factor. The power factor of a load is defined as the true power (kw.) divided by the apparent power (kva.), but in the case of a cyclic oil field pumping load average values are desirable and the power factor would be kwh./kvah. Since both factors are variable, it is not only difficult to determine the power factor but it is also difficult to apply it once it is determined. There is a possibility that the cart is being put before the horse by working with the power factor of the cyclic load when the power factor has a real value of its own only when a power factor clause is included in the power contract.

Individuals, corporations, and companies spend money only in the hope of getting money in return (by interest, capital gain). The installation of capacitors require the expenditure of money, and the purchaser, therefore, wishes to know when and how this money will be returned. The only ways for a return to be made on this investment when no power factor clause is included in the contract is: (1) a reduction of power consumed; (2) reduction of maintenance cost; (3) when the expenditure of a sum for capacitors will decrease the necessary expense for increased capacity.

**Power consumption.** — Considering the first item of reducing purchased power; that part of the power purchased for an oil lease which does work, i.e., supply the pumping load, cannot be reduced directly by introducing capacitors. Only the system losses are effected directly. The system losses are nearly all $I^2R$ losses. To reduce these losses we are interested primarily in the effect on the current produced by the capacitors. The fact that the power factor is altered is incidental.

Since the resistance of a system is more or less readily determined by a standard engineering calculation, the problem is to determine just what effective current is imposed on the system by an oil-field pumping load and how that current and the consequent losses vary with the installation of capacitors.

**Maintenance cost.**—In considering Item 2, reduction of maintenance costs, the primary influence that may be expected from capacitors installation on maintenance costs are the improvement of voltage and consequent increase in motor life and the reduction of effective load on the system equipment. The motor voltage is a function of the impedence drop (IZ). The load on the system equipment is a function of the voltage and current (EI). Once again attention is directed to the fact that power factor

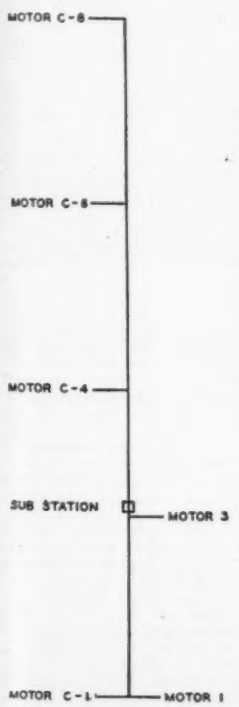
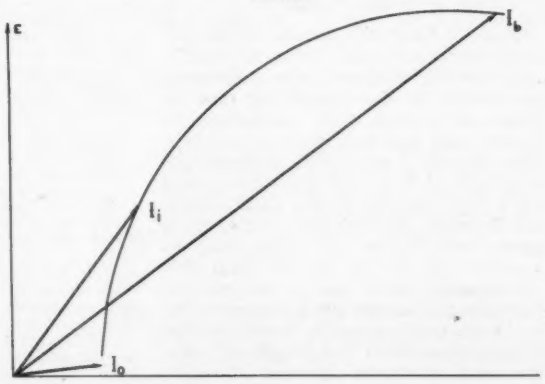



*Fig. 1—(Left) Location of motors in lease under test. All secondary No. 4 copper 3-15-kva. transformers.*

**MOTOR DATA**

| | C-1 | All others |
|---|---|---|
| Location | C-1 | All others |
| Horsepower | 10 | 10 |
| Starting torque | Normal | High |
| Full load, r.p.m. | 1,160 | 1,170 |
| Voltage | 440/220 | 440/220 |
| Amperes full load | 27.4/13.7 | 28/14 |
| Phase | 3 | 3 |
| Cycles | 60 | 60 |

*Fig. 2—(Below) Circle diagram of an oil-field-type induction motor.*



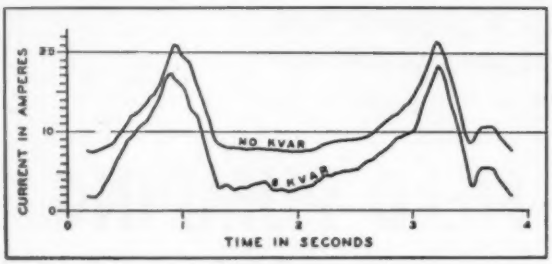



Fig. 3

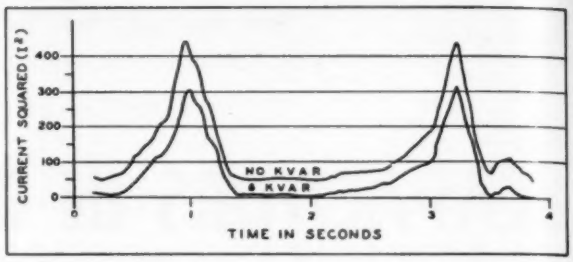



Fig. 4

*Envelope of 60-cycle current at location C-8.*

is only an incidental consideration. The primary consideration is the current.

When the test results described herein were being studied, the reduction of power consumption of a lease after installation of capacitors greatly exceeded the expected reduction of system losses. However, several manufacturers of motors publish data that indicate that a 10 per cent decrease in operating voltage from rated voltage at full load will cause a 2 per cent drop in motor efficiency.

Assuming an 85 per cent efficiency for a 10-hp. motor, at full load the input would be approximately 8.75 kw. If a 10 per cent undervoltage condition exists, the efficiency would drop to 83 per cent and the input would rise to 9.00 kw. Thus a capacitor application, on a fully loaded 10-horsepower motor, that would correct for a 10 per cent undervoltage condition at the motor might be expected to reduce the motor input by 1/5 to 1/4 kw. Where a number of motors run a half a day or more, the reduction of power consumption brought about by the correct application of capacitors for voltage correction may be an item of considerable influence.

No data seem available on the subject, but it is generally believed that motors operated at reduced voltages have a shortened life. In cases of large leases fed from a single transformer bank or of excessively long secondary lines, this reduced motor life due to reduced voltage may be an item of considerable importance or even the deciding factor in determining whether capacitors are installed or not. Voltages of 400 volts and less are not uncommon in the Panhandle oil fields.

Low voltage always tends to produce maintenance problems. On large leases it may introduce problems of insufficient starting torque. Low voltage at peak loads leads to difficulties in proper application of overload devices and may influence the operation of control relays.

There is some indication that capacitors give additional lightning protection to motor installations. Experience in the last year in the Panhandle area has led to the belief that where capacitors are present, the capacitors will blow up rather than the motor burn out. At the moment there is not enough evidence to justify even a tentative conclusion.

**Capacity.**—In considering Item 3, savings due to release of system capacity, the system capacity is determined by its ability to dissipate heat and the primary source of heat is $I^2R$ losses. The capacity of lines, motors, transformers, and switch gear is generally limited by the heat-dissipation ability of each item of equipment. This ability is a design characteristic of the equipment and cannot be readily changed in existing equipment.

If it is decided to add load to a transformer bank which is fully loaded but is operating at a lagging power factor, some part of the bank capacity may be released by the installation of capacitors. The capacity thus released is determined by the amount of current reduction and the resistance of the bank. The fact that the power factor may be improved is once again incidental. The important fact is that the $I^2R$ losses are reduced. The same line of reason will hold for all of the system's equipment.

The argument presented above, in a more or less outline form, leads to the conclusion that the major factor to be considered in determining the correct capacitors for an oil-field load is the influence that the capacitors will have upon the current and not power factor. For this reason the tests conducted for this paper were made in an effort to determine the effect of capacitor installations on current.

## Field Tests

Due to the cyclic nature of an oil-field pumping load, it is extremely difficult to measure the electrical quantities in the circuit by use of standard meters. The oscillation of power and current occur so rapidly that standard electrical instruments may overswing and give erroneous high readings or, if the instruments are damped, the high load and current peaks may occur and disappear so rapidly (10 to 20 cycles) that the instruments will never indicate as high as the direct peak. In addition to these problems, the losses in the circuit depend on the length of time the peak load persists upon the system and standard electrical instruments have no way of determining the duration of these peaks. For the purposes of these tests, therefore, an oscillograph was used in order that instantaneous 60-cycle peaks could be measured without introducing complications of damping.

The first tests of this series were made July 19, 1949, at Shamrock Oil & Gas Co.'s Logan lease. Indicating instruments were used at the wells and recording instruments at the substation. Many combinations of wells running with no capacitors, 1 kvar. and 2 kvar. were tested. The results were surprising and conflicting and the most concrete information learned was the difficulty of gathering information with indicating instruments.

Following this first test, 2-kvar. capacitors were installed at all the motors on the Logan lease. In the period July 19, 1949, to August 15, 1949, the power consumption was closely studied and, using the utility-company primary motor as an instrument, the power consumption of this lease was reduced 96 kwh. per day, approximately a 5 per cent saving.

The next group of tests were conducted at Shamrock Oil & Gas Co.'s McNutt lease on August 17, 1949. A number of different types of instruments were used at the wells and damped Esterline Angus recording motors at the substation. The latter instruments had chart speeds of 6 in. per minute.

For one test the north leg of the lease was operated alone (see Fig. 1). By using a planimeter to measure the area of a chart recording kva. and a chart recording kw., a calculated power factor of 34.5 per cent was determined at the substation with no capacitors installed. With 2 kvar. at each well, the calculated power factor was 38.8 per cent and with 4 kvar. at each motor the power factor was 60.5 per cent.

Once again the readings taken at the wells by indicating instruments were confusing. Ordinary indicating instruments were not satisfactory for this type of test.

During the next few months several tests were run at individual locations in an effort to determine just how to obtain data. Finally, in August 1950, a recording oscillograph was made available by Southwestern Public Service Co. With this instrument a series of over 30 individual tests were conducted. Some of the results of the first few tests were lost while a satisfactory test and developing procedure was determined and there now remains an even 30 films.

The interpretation of these film records is a lengthy task and only 6 records have been fully investigated. The 6 were chosen

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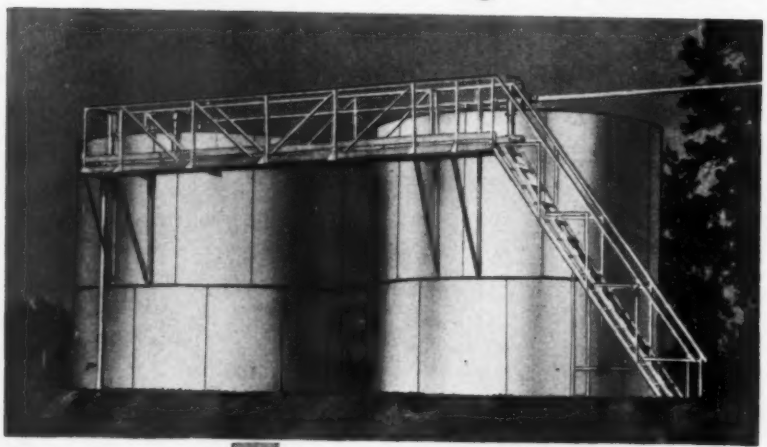

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from the 30 because they represent the smallest lease on which every motor was tested. It was also desirable to check results by this method against results by previous methods.

The test procedure used with the oscillograph was as follows: A box was built to contain a current transformer, potential transformer, all necessary leads, two 2-kvar. capacitors, two 1-kvar. capacitors, switches, fuses, and stepped resistance box. The test box was connected into motor circuit by using leads preconnected to fuses.

At the time of test, the starter box fuses were pulled, test fuses installed, leads from test box to oscillograph connected, and the oil-well motor started. After the well had pumped a few strokes, the oscillograph recording was started just before the pump crank reached top dead center. As the crank came to top dead center again, a 2-kvar. capacitor was switched in, then 2-kvar. more, then 1 kvar., and finally 1 kvar. more for a total of 6 kvar. It is interesting to note, in passing, that a test could be run in 3 minutes, including all connections and disconnections, but it sometimes took 30 minutes between wells on the same lease. On all tests made, capacitors were connected into circuit on motor side of oil-field starter. Thus, capacitors were in service only while motors were in operation and under test.

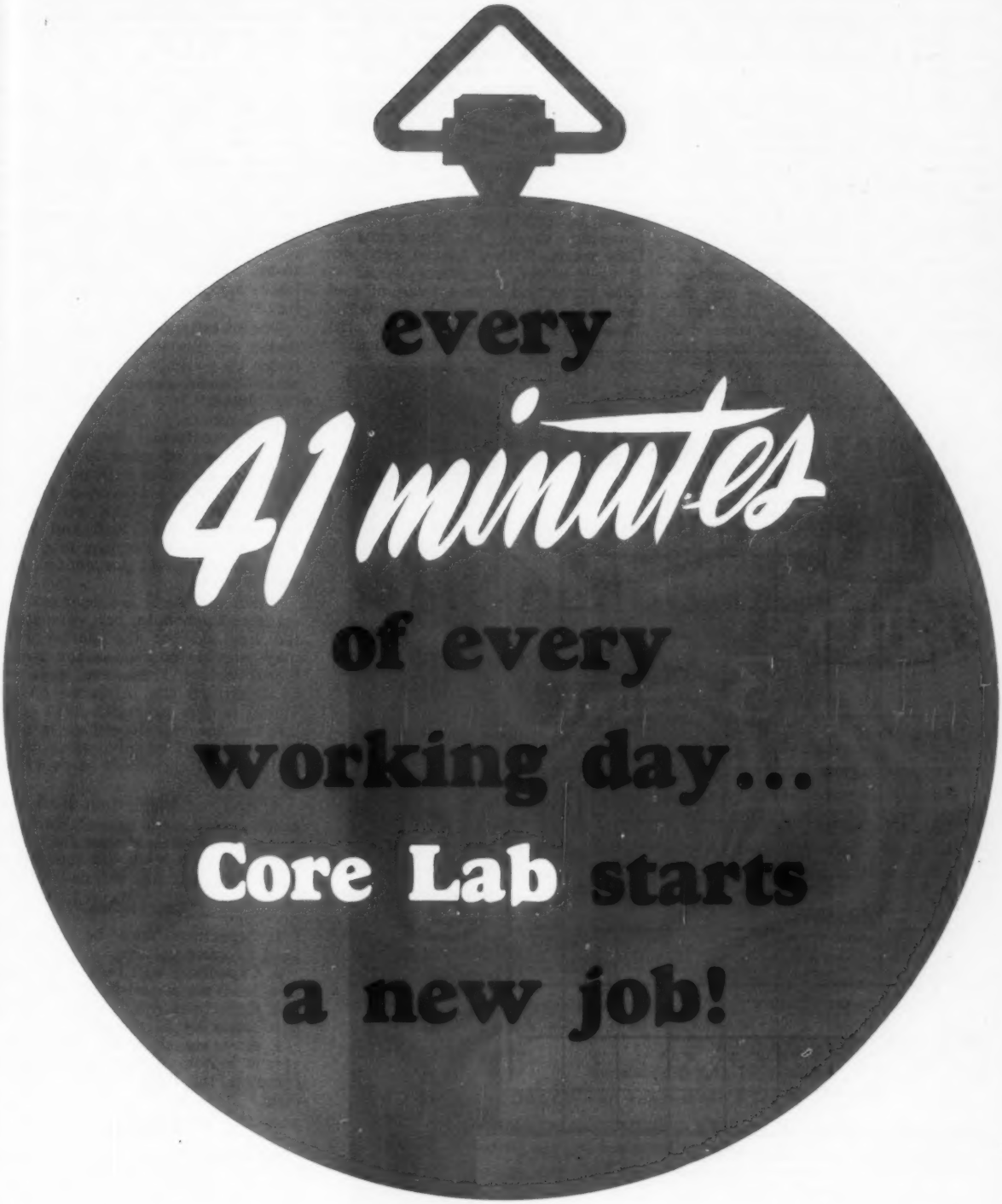
The results of the oscillograph tests are summarized in tables in the appendix, but before studying these tables, it is worth while to look over the graph of motor current through one pumping cycle as shown by Fig. 1. Fig. 1 is a plot of the peaks of current for each electrical cycle throughout the pumping stroke which for this particular well took about 220 electrical cycles. Notice that the maximum current reduction occurred when the motor was lightly loaded. Referring to Fig. 2, it is easily seen that when the motor is at light load, the current is nearly all reactive, but when the motor is fully loaded, the power component is the larger. Therefore, the application of a capacitor will produce a greater reduction of current at light loads than at full load.

Fig. 4 was drawn after squaring each electrical cycle as plotted in Fig. 2. Fig. 4 shows that the maximum correction so far as $I^2$, and therefore the losses, is concerned occurs at the time of peak motor load.

Turning now to the tables in the appendix, Table 1 gives the average current which would represent a stead-state current replacing the motor current. Table 2 represents the steady-state current which would produce the same losses as the motor current, Tables 3 and 4 tabulate the maximum fluctuations of current in one pump stroke.

Notice that the current in Table 2 is always equal to or greater than the current of Table 1, and that the greater the difference between the minimum currents of Table 3 and the maximum current of Table 4, the greater, in general, is the difference between the average and effective currents.

Table 5 was calculated by determining the values of the peak currents when lifting the sucker rod and when

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lifting the counterweight and dividing the larger by the smaller. This factor seems to have little effect on the effective current.

Table 6 was computed by dividing the effective current at each condition of capacitor installation by the current with no capacitor installed. Location C-6 had a 2-kvar. capacitor permanently installed.

Table 7 is an attempt to determine the possibilities involved when varying currents are combined. The calculation of the values in Table 7 is explained in the appendix. Comparison with Table 1 will show that the current is slightly greater than twice the value in Table 1 in all cases but one, and slightly less than twice the value of current in Table 2. Therefore, there is a strong indication that calculations of losses based on an average current will be slightly low and calculations based on the effective current of one motor will be slightly high.

Basing calculations on .25 ohms per 1,000 ft. for No. 4 copper and using currents from Table 1, the secondary losses of this lease with all wells pumping would be approximately 1,980 watts. With a 2-kvar. capacitor at each motor, the losses would be 1,359 watts and with 4 kvar. at each motor, the losses would be 900 watts. These figures show the losses with 2 kvar. at each motor to be 69 per cent of the losses with no capacitors installed and with 4 kvar. at each motor the losses are 46 per cent of the original condition. Using rough averages from Table 6, a 2-kvar. capacitor reduces the current to 85 per cent of its original value and 4 kvar. reduces the value to 75 per cent. The losses based on the percentages given in Table 6 would be 72 per cent with 2 kvar. at each motor and 54 per cent with 4 kvar. at every motor. All motors on this lease are 10-hp. motors. Transformer bank losses are not included in the above figures.

The installation of 4 kvar. at every motor on this lease will reduce the losses by roughly 300 kwh. a month, while 2-kvar. capacitors will reduce the losses by approximately 175 kwh. a month.

The transformer bank will have 108 per cent of rated load when all wells are pumping with no capacitors installed. With a 2-kvar. capacitor at every motor, the bank will have 89 per cent of rated load and with 4 kvar. at every motor, the load on the bank would be 72 per cent of rated load.

When the wells are operated on a staggered schedule, one capacitor on the line side of the starter switch may provide correction for two (or more) motors. These tests were made to determine the influence on individual motors produced by a capacitor, but the test procedure is not to be interpreted as advocating the installation of capacitors at every well location.

A study of Fig. 1 and the oscillograph record made as described above brings home the extreme fluctuations of an oil-field load and the difficulties it presents to analysis.

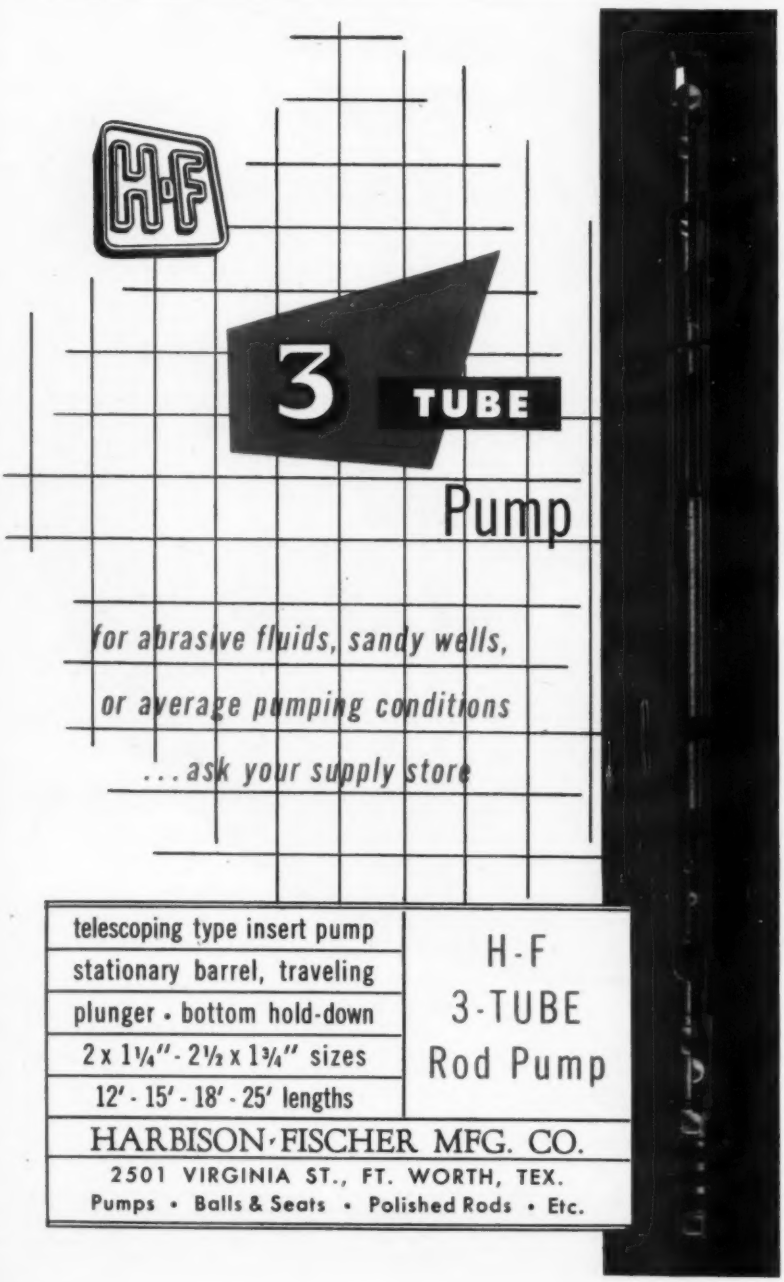
### Conclusions

1. Capacitors may be effectively used to raise voltage.
2. Capacitors will reduce the effective load on an oil-field bank.
3. Capacitors may reduce the system losses by 50 per cent.
4. Accurate data on motor losses versus motor voltage are needed to complete the data for this series of tests.

### Appendix

The average current of a pumping cycle has been computed by scaling the peak of every electrical cycle in one pumping cycle, dividing by the number of electrical cycles, converting to amperes and is recorded in Table 1. The average loss current has been computed by squaring the peak of every electrical cycle, dividing by the number of electrical cycles, taking the square root, converting to amperes and is recorded in Table 2. This latter value represents the steady-state current which would produce the same system losses as the fluctuating motor current.

The question arises, how would two motor currents combine in a single section of line? If two wells at the end of a single secondary line are pumping at the same time, they normally will not synchronize. Over a long period of time, then, if each electrical cycle in a pump stroke were

numbered, cycle 1 of motor 1 would eventually add to cycle 1 or motor 2, then cycle 2 of motor 2, etc., until it had added to every electrical cycle of motor 2. Each electrical cycle of motor 1 would do the same. It is obviously a tremendous task to make this type of a solution for every possibility in a six-well lease, so the problem will be attacked from a viewpoint of two identical wells at the end of the line.

If we designated the scaled value of each electrical cycle as $a_1$, $a_2$, $a_3$ . . . $a_n$ when there are n electrical cycles in one pumping cycle, then the heating effect ($I^2$) of the combined current over a number of pumping cycles can be expressed by a series of equations. Summation of the series leads to the expression:

$$I = (2n\ B + 2A^2/n^2)^{1/2}$$

where

$$A = a_1 + a_2 + a_3 + \ldots + a_{n-1} + a_n \text{ and}$$

$$B = a_1^2 + a_2^2 + a_3^2 + \ldots + a_{n-1}^2 + a_n^2$$

The values of I, or the combined loss current, have been calculated and recorded in Table 7.

**TABLE 1—AVERAGE CURRENT**

| Motor | Capacitor None | 2kvar | 4kvar | 5kvar | 6kvar |
|---|---|---|---|---|---|
| 1 | 8.2 | 6.4 | 4.9 | 4.3 | 3.5 |
| C-1 | 6.8 | 5.4 | 4.1 | 4.0 | 4.5 |
| 3 | 11.2 | 9.4 | 7.9 | 7.1 | 6.6 |
| C-4 | 10.6 | 8.8 | 7.0 | 6.1 | 5.6 |
| C-6 | ... | 8.7 | 7.0 | 5.6 | 5.6 |
| C-8 | 11.3 | 9.5 | 8.1 | 7.5 | 7.2 |

**TABLE 2—AVERAGE LOSS CURRENT**

| Motor | Capacitor None | 2kvar | 4kvar | 5kvar | 6kvar |
|---|---|---|---|---|---|
| 1 | 8.2 | 6.5 | 5.1 | 4.6 | 4.1 |
| C-1 | 7.2 | 6.1 | 5.3 | 5.2 | 5.3 |
| 3 | 11.7 | 10.2 | 8.9 | 8.5 | 8.1 |
| C-4 | 11.1 | 9.5 | 8.1 | 7.5 | 7.2 |
| C-6 | ... | 9.4 | 8.0 | 7.4 | 8.7 |
| C-8 | 12.0 | 10.5 | 9.3 | 8.9 | 8.6 |

**TABLE 3—MINIMUM CURRENT**

| Motor | Capacitor None | 2kvar | 4kvar | 5kvar | 6kvar |
|---|---|---|---|---|---|
| 1 | 6.7 | 4.8 | 2.7 | 1.9 | 0.8 |
| C-1 | 4.7 | 2.6 | 0.9 | 0.6 | 1.8 |
| 3 | 7.7 | 5.5 | 3.0 | 1.9 | 1.1 |
| C-4 | 7.6 | 5.5 | 3.0 | 2.0 | 0.9 |
| C-6 | ... | 5.7 | 3.4 | 2.2 | 1.3 |
| C-8 | 7.0 | 5.2 | 3.0 | 1.5 | 1.5 |

**TABLE 4—MAXIMUM CURRENT**

| Motor | Capacitor None | 2kvar | 4kvar | 5kvar | 6kvar |
|---|---|---|---|---|---|
| 1 | 11.0 | 9.2 | 8.5 | 8.1 | 7.7 |
| C-1 | 13.8 | 13.0 | 11.9 | 11.7 | 11.9 |
| 3 | 18.5 | 17.2 | 17.1 | 17.0 | 15.2 |
| C-4 | 21.4 | 20.4 | 19.7 | 18.6 | 18.5 |
| C-6 | ... | 19.8 | 18.8 | 18.1 | 17.1 |
| C-8 | 21.3 | 20.5 | 18.6 | 18.2 | 18.1 |

**TABLE 5—PEAK CURRENT BALANCE**

| Motor | Capacitor None | 2kvar | 4kvar | 5kvar | 6kvar |
|---|---|---|---|---|---|
| 1 | 1.11 | 1.05 | 1.06 | 1.24 | 1.12 |
| C-1 | 1.22 | 1.16 | 1.15 | 1.19 | 1.24 |
| 3 | 1.02 | 1.00 | 1.01 | 1.03 | 1.06 |
| C-4 | 1.30 | 1.34 | 1.35 | 1.33 | 1.33 |
| C-6 | ... | 2.04 | 2.40 | 2.38 | 2.43 |
| C-8 | 1.00 | 1.01 | 1.00 | 1.01 | 1.04 |

**TABLE 6—PER CENT CURRENT REDUCTION**

| Motor | Capacitor None | 2kvar | 4kvar | 5kvar | 6kvar |
|---|---|---|---|---|---|
| 1 | 100 | 80 | 62 | 57 | 51 |
| C-1 | 100 | 85 | 73 | 72 | 74 |
| 3 | 100 | 87 | 76 | 72 | 69 |
| C-4 | 100 | 85 | 73 | 67 | 64 |
| C-6 | ... | ... | ... | ... | ... |
| C-8 | 100 | 87 | 78 | 75 | 71 |

**TABLE 7—COMBINED LOSS CURRENT**

| Motor | Capacitor None | 2kvar | 4kvar | 5kvar | 6kvar |
|---|---|---|---|---|---|
| 1 | 16.3 | 13.0 | 10.1 | 8.9 | 7.7 |
| C-1 | 14.0 | 11.6 | 11.2 | 9.3 | 9.8 |
| 3 | 22.8 | 19.5 | 16.8 | 15.7 | 16.6 |
| C-4 | 21.8 | 18.2 | 15.1 | 13.6 | 12.9 |
| C-6 | ... | 18.1 | 15.0 | 13.6 | 12.6 |
| C-8 | 23.3 | 20.0 | 17.5 | 16.6 | ... |

**TABLE 8—VOLTAGE AT PEAK LOAD**

| Motor | Capacitor None | 2kvar | 4kvar | 5kvar | 6kvar |
|---|---|---|---|---|---|
| 1 | 430 | 438 | 440 | 438 | 434 |
| C-1 | 434 | 436 | 438 | 442 | 442 |
| 3 | 454 | 458 | 458 | 462 | 462 |
| C-4 | 438 | 442 | 442 | 446 | 446 |
| C-6 | ... | 418 | 422 | 426 | 426 |
| C-8 | 405 | 413 | 422 | 424 | 426 |
| C-8* | 430 | 434 | 442 | 446 | 450 |

*Highest voltage in pump cycle.

# BOOKS

A.S.T.M. METHODS FOR CHEMICAL ANALYSIS OF METALS. (A Part of the Book of A.S.T.M. Standards.) Published by American Society for Testing Materials, 1916 Race Street, Philadelphia. 476 pp. $6.50.

Now containing 39 extensive standards, this publication is the only one where these chemical methods appear together in a convenient book form. The newer methods included take advantage of shorter procedures which have been developed and also cover additional metals. Several spectrochemical methods included were prepared by Committee E-2 on emission spectroscopy. Included in the volume is a very detailed index which lists each method and procedure under at least two broad headings—the material covered and the substance being determined. Also, all methods in certain special classes such as photometric and electrolytic are so listed.

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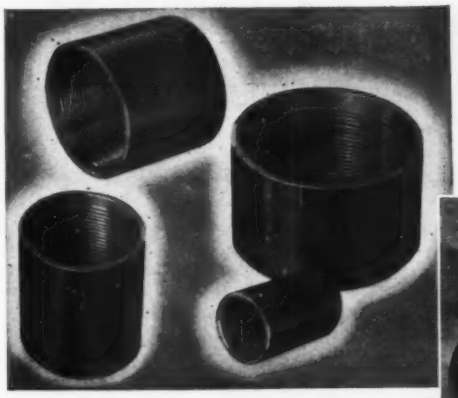

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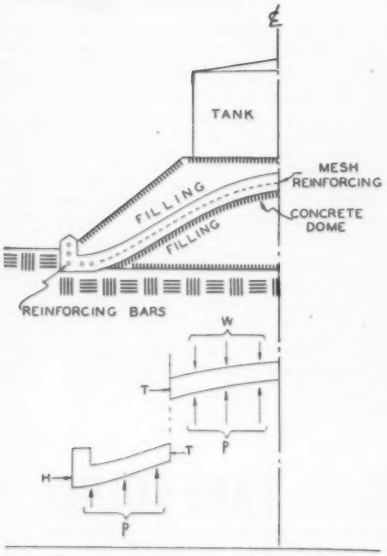


*Fig. 1—Cross-sectional layout and force diagram for typical Durley Dome.*

*Fig. 2—Excavation in which dome will be installed. This view of a portion of the Shell Haven refinery being built in England by Shell.*

## Shell Haven Refinery Uses

# "Durley Dome" Foundations For Large-Diameter Tanks

**by V. S. Swaminathan***

OIL-STORAGE tanks are frequently erected on bases filled with sand, gravel, or other material, laid directly on the ground without interposition of a rigid load-distributing footing. Since the load imposed by such tanks and their contents is generally of the order of about 1 ton per square foot this arrangement is quite satisfactory where the ground is of average, or good, bearing quality. However, it is often necessary to install storage tanks in locations where the soil is of a clay-silt character of very low shear strength.

Where the soil bearing is of low value either piling or spread footings are used to keep the load within safe limits. Owing to the very large total load to be supported, the conventional type of spread footing becomes prohibitive in cost and its own weight adds to the load to be carried. To provide a foundation at an economical cost, coupled with low deadweight, a thin shell structure, known as the "Durley Dome," has been developed in England by Reinforced Concrete Steel Co., Ltd., of Westminster. Fig. 1 shows a cross-sectional view of the Durley Dome.

In plan the Durley Dome is circular and concentric with the tank it supports. Within the area directly below the tank itself the section is the same as an ordinary dome, a spherical zone, convex to the tank bottom. The portion of the Durley Dome outside of the supported tank is of hemitoroidal of split-ring form with its curved portion opposite to that of the spherical zone portion underneath the tank. The toroidal portion is tangent to the horizontal at its outer end. This portion of the structure is designed to resist hoop tension. By vir-

*5 Field Road, Bedford Park, London, W4.

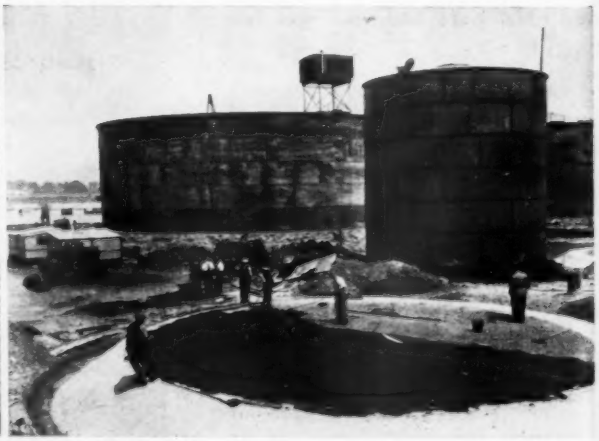

*Fig. 3—(Left) Subbase for Durley Dome. Fig. 4—(Right) Mat on which tank will be placed is installed atop the concrete dome.*

XUM

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# *Building a record... with Gulf!*

THE OCCASION of the Fiftieth Anniversary of both Gulf and Kellogg is a most appropriate time to review the record of their association. It all began some fifteen years ago when Kellogg built a small stabilizing plant in Port Arthur, Texas . . . the first unit for this refiner.

Propane deasphalting and phenol treating lube facilities were the next assignment . . . during the World War II period.

Immediately thereafter, Kellogg undertook in rapid succession, the engineering and construction of three major cat-crackers at three different Gulf refineries . . . in Philadelphia, Cincinnati and Toledo.

Currently, Kellogg is building another fluid unit for Gulf at Port Arthur—a cat-cracker with the world's largest throughput, some 60,000 barrels per day.

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*for fifty years an integral part of processing history*

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XUM

# Portrait at

*This year is Kellogg's fiftieth of service to industry. At this time naturally, as a group of men—known collectively to the modern business world as The M. W. Kellogg Company—we can think back nostalgically. We can remember the chimney stacks*

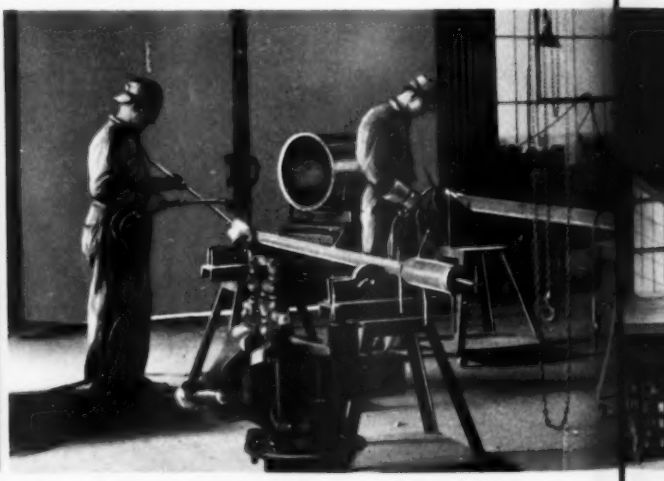
## "What is *OUR* Objective?"

*. . . It's as simple as this. To provide the most efficient processing facilities which modern engineering can devise.*

*Obviously, this objective has required the creation and continuous expansion of research and development personnel and equipment. What then, is the status today?*

**1.** *ONE PHYSICAL INDICATION* of Kellogg's position in the vanguard of technical progress was its early use of the mass-spectrometer . . . the second to be sold to the commercial world. In itself just one of the "tools" utilized by Kellogg in the unending search for improved methods of commercial processing, it is symbolic of the company's approach to technical problems.

**4.** *THE BACKBONE* of the integrated development laboratories is the one-to-two-barrel-a-day pilot plant from which data are obtained to design more efficient commercial plants. And for each of the completed *metal* pilots, tens of glass units, such as this one, go before, in order to investigate thoroughly the peculiarities of a given process as revealed in each of its various steps.

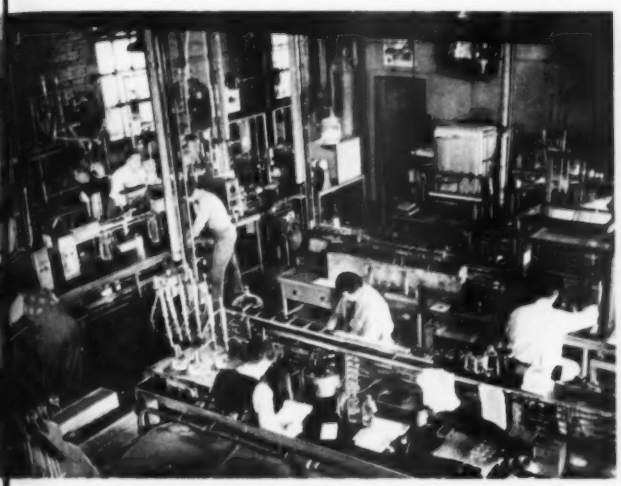


**5.** *AFTER THE "GLASS STAGE"* comes the engineering and building of *metal* pilots. More often than not, the engineering of a pilot unit proves even more complicated than the engineering of a commercial plant because every pilot, to be of value, must have unusual flexibility. All Kellogg pilots—from the earliest thermal cracker to the latest Orthoflow Fluid unit—have been built in this shop.

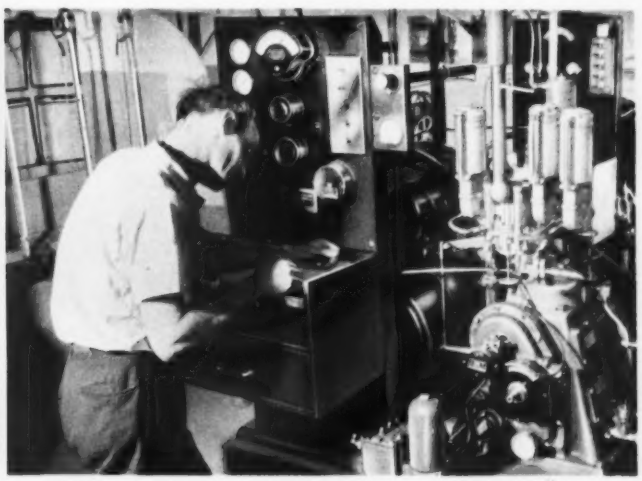
# fifty... no.

1901-1951 50th Anniversary

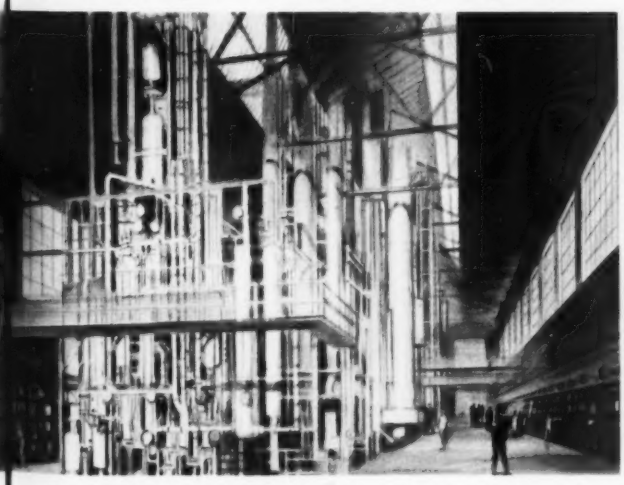
*we built in 1901 . . . the first crude vessels for oil refiners in the 'teens . . . our first combination unit. The forty-odd Fluid cat crackers built in these years. But the company is like a man. At fifty, it's a time for a "check-up". After all, The M. W. Kellogg Company is only a factor as it is able to serve industry today. For that reason, we present this first camera study in a series which will document our belief that a truly integrated organization can better serve industry to achieve greater earning power.*



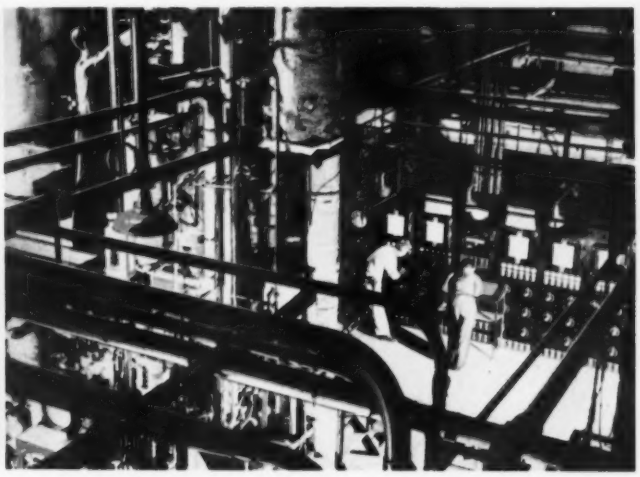
**2.** *APPLIED RESEARCH* is the fence around Kellogg's development work. For example, in the field of polymerized chemicals, our contribution lies in their *economical* production in contrast to seeking out new chemicals *per se*. This laboratory provides qualitative checks on the company's "miniature" processing facilities . . . develops *catalysts* . . . aids in scanning the horizon for more efficient processing methods.



**3.** *LIKE THE CHEMICAL LABORATORY*, the octane-rating equipment here is just a part of Kellogg research and development facilities. While industry-wide improvements passed on to the ultimate consumer have one of their beginnings here. . . . it goes without saying that such testing equipment forms but an *nth* fraction of the total facilities Kellogg has to serve industry today.



**6.** *AS SKETCHED ABOVE*, the Kellogg pilot plant building today houses more than twenty separate units. They duplicate the major refining processes utilized in the present-day refinery—from delayed coking and decarbonizing to catalytic cracking and catalytic reforming. Continuously "on stream", these pilots provide data for both Kellogg development divisions and Kellogg customers.



**7.** *TWO Fluid* catalytic cracking pilot plants—one of the side-by-side vessel arrangement and one of the single vessel, Orthoflow type—pinpoint expected yields on new installations and also test projected improvements. Pictured is the side-by-side unit which provided much of the design data for the more than twenty commercial units built by Kellogg during the war period as well as the twenty-five post-war Kellogg units.

**NEXT MONTH**

*. . . in the second in this series of camera studies of M. W. Kellogg today . . . you will see the part metallurgy plays in the complete picture of this integrated organization . . .*

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tue of this shape primary bending and shear are eliminated, and the stresses induced by the weight of the tank with its contents and the balancing earth reaction are all direct ones, namely radial and hoop compression and hoop tension around the perimeter.

When the tank is flat bottomed, as is generally the case, it is necessary to provide a sand or other filling between the dome foundation and the tank. To prevent this filling from sliding down the slope of the dome, or otherwise spreading, a low curve is provided around the perimeter of the support.

The forces acting on the structure are shown diagrammatically in Fig. 1. The weight W of the tank and contents (and filling where required) is balanced partly by the ground reaction p acting over the same area, and in part by the vertical component of a radial thrust T acting at the boundary of the tank. The thrust T is in its turn balanced by the earth reaction (minus the weight of filling) on the outer portion and the hoop tension H.

Some of these domes are in course of construction by John Mowlem & Co. at the new Shell Haven refinery in England. These were the first to be built, and were specified by the consulting civil engineers, Maunsell, Posford, & Pavry.

The domes are of varying sizes, the over-all diameters ranging from 39 to 73 ft. carrying tanks of diameters of from 29 to 52 ft. For the largest tank the over-all rise of the dome is 6 ft. The thickness of the concrete shells, which are reinforced with steel mesh vary between 6 and 9 in. The outer rings are reinforced with bars.

Some of these domes have been test loaded by filling the supported tanks with water (about 20 per cent excess over maximum working load). The settlements were much less than those of the conventional type of foundation used in this area of England. In one case a dome was constructed on the site where an overturning failure occurred previously and when loaded the settlement was negligible.

## BOOKS

ORGANIC REAGENTS FOR ORGANIC ANALYSIS. By the Hopkins & Williams Laboratory Staff. Published by Chemical Publishing Co., 26 Court Street, Brooklyn. 263 pp. $5.

About 100 pages of important new developments in organic analysis and organic reagents have been added to the first edition of the book. In the first part of the book, the major classes of organic compounds are given, and for each selected reagents are listed which are best for the identification of the class. The second part of the book is a detailed discussion of the selected reagents in alphabetical order. The third part consists of alphabetical melting-point tables of the derivatives discussed in the preceding part of hundreds of organic compounds.


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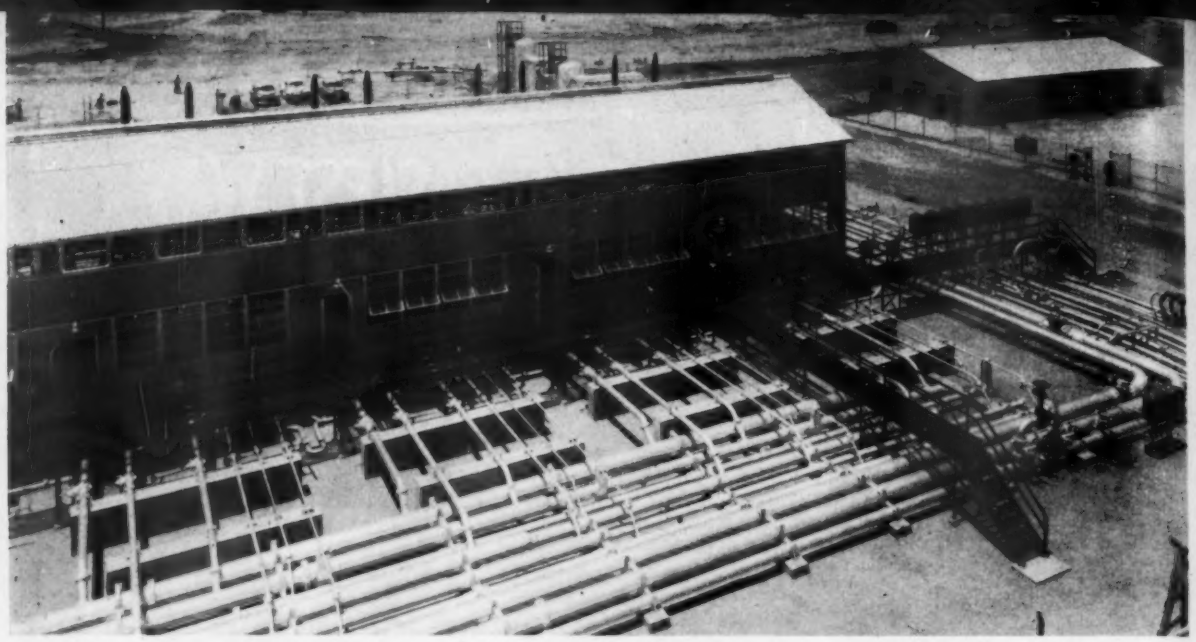


*Portion of the compressor piping system which, because of its design and sizing of pipe, is substantially pulse free.*

# "Built-In" Pulsation Dampener

## *provided in compressor piping system at Richfield's new Cuyama plant*

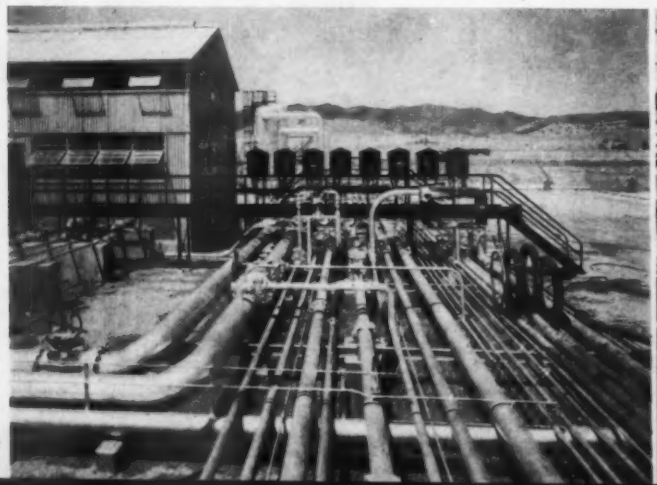
**by D. H. Stormont**
California District Editor

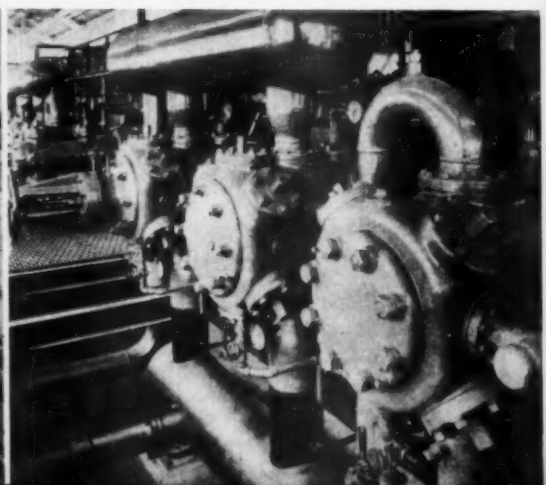
AT Richfield Oil Corp.'s new South Cuyama absorption and gas-injection plant in California's famed Cuyama Valley, vibrations in compressor piping and related equipment are unnoticeable and almost completely nonexistent. Gas flow in the compressor piping is smooth, with a minimum pressure drop, and metering is being accomplished with virtually no indication of pulsation on the recording charts.

**The South Cuyama absorption and injection plant is one of the most modern and efficient plants of its kind, featuring maximum flexibility at minimum cost, reliable automatic controls, proper balance between the human element and safety devices, and a number of new, but proven and tested features. It will process 30,000 M.c.f. of gas daily and produce 150,000 gal. of liquid products and 24,000 M.c.f. of residue gas.**

This substantially pulse-free piping system, the first of its type installed, was made possible through use of a pulsation dampener which is inherent to the compressor piping itself. In other words, headers, lateral piping, and bottles (volume tanks) are designed and sized so that in themselves they act as an acoustical filter. They offer high impedance to pressure fluctuations but only small resistance to steady gas flow.

*Left: Bottles (volume tanks) on the low-stage suction and discharge, as well as on the second and high-stage cylinders, contribute toward making the gas system free of pulsations. Right: Hold-down equipment to prevent vibration is noticeably absent in this run of piping to the orifice meters.*





The harmful effects of gas-stream pulsations and subsequent vibrations have long been known to the industry. Among these are reduced operating efficiency of compressors, higher maintenance costs, and lowered accuracy of measurement. Extreme cases have caused failures in piping and other equipment because of stress conditions set up by the pulsating flow of gas.

Heretofore, efforts to prevent excessive vibration in compressor piping and related equipment often consisted of utilizing oversize piping and "hold down" equipment or other mechanical dampening devices. Among these are orifices and other throttling apparatus. In recent years, pulsation problems have been overcome by the installation of "packaged type" dampeners in the form of extraneous equipment. The Richfield South Cuyama plant is the first plant wherein pulsation dampening is effected through the design of the piping system itself.

Compression facilities at the South Cuyama plant consist of eight three-stage, 660-hp. gas-engine-driven units with a header system designed for future installation of four more units. In the low stage, gas is taken at a suction pressure of about 15 psi. and boosted to 110 psi., the second stage compresses from 100 psi. to a discharge of 460 psi., and in the high stage, gas is boosted to 1,800 psi. from an inlet pressure of 450 psi.

As stated earlier, pulsation dampening is integrally provided for by the design and sizing of the bottles, laterals, and headers in the compressor piping system. The entire system, the design of which is baed on applications of acoustical principles to fluid flow systems, was installed by Fluor Corp., Ltd., which holds the patents.

The general features of this pulsation-dampening system are illustrated in the accompanying photographs. Study of the exterior piping readily shows that the laterals are smaller than in conventional systems and that the headers diminish in diameter at one end. The size piping used, and that of a conventional system to handle the same volume of gas, are given in the accompanying table. In addition to the reduction in pipe sizes, the fact that the pipe is at rest removed the need for extra anchoring.

**SIZES OF LATERALS AND HEADERS AT CUYAMA PLANT AND CONVENTIONAL SYSTEM (in inches)**

| | Cuyama system | Conventional system |
|---|---|---|
| Lateral piping: | | |
| First-stage suction | 8 | 10 |
| First-stage discharge | 6 | 8 |
| Second-stage suction | 6 | 8 |
| Second-stage discharge | 3 | 6 |
| Third-stage suction | 2 | 4 |
| Third-stage discharge | 2 | 3 |
| Headers: | | |
| First-stage suction | 24-20 | 24 |
| First-stage discharge | 18-16-12 | 18 |
| Second-stage suction | 18-16-12 | 18 |
| Second-stage discharge | 14-12- 8 | 14 |
| Third-stage suction | 10-8 | 10 |
| Third-stage discharge | 8 | 8 |

The plant has been in operation since June 1950. The varied conditons under which it has operated to date have proved beyond any question of doubt the effectiveness of the dampening system.

## BOOKS

ERDOEL—MAECHTE UND PROBLEME. By A. M. Stahmer, Published by Butzon & Bercker, Kevelaer, in German. Available through Erdole-Informations-dienst, Alsterufer 4/5, Hamburg, 36, Germany. 172 pp. $1.70.

Even in traditional coal countries in Europe such as Great Britain and Germany, oil is gaining more and more of a leading role as a source of industrial energy. The general public is interested in the structure of the oil industry and those developments which have a far-reaching influence on economic conditions and even on political decisions. A comprehensive, over-all review of the industry is presented in this book by the editor of the German Oil News Service. With photos and graphs as illustrations, it describes the raw material and its products, the progress from a wildcat to a producing field, the world's oil reserves, transportation questions, the risks of refining, leading oil countries of the world with their concessions and shares, and current problems facing the industry. In light of recent international developments, the chapter on Russia is of particular interest. For the U.S.S.R. and its satellites, the author estimates a share of 10.2 per cent of the world's crude reserves, 8.4 per cent of production, 7.9 per cent of refining capacity, and 0.6 per cent of the tanker tonnage.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Now drilling a 4,874-ft.
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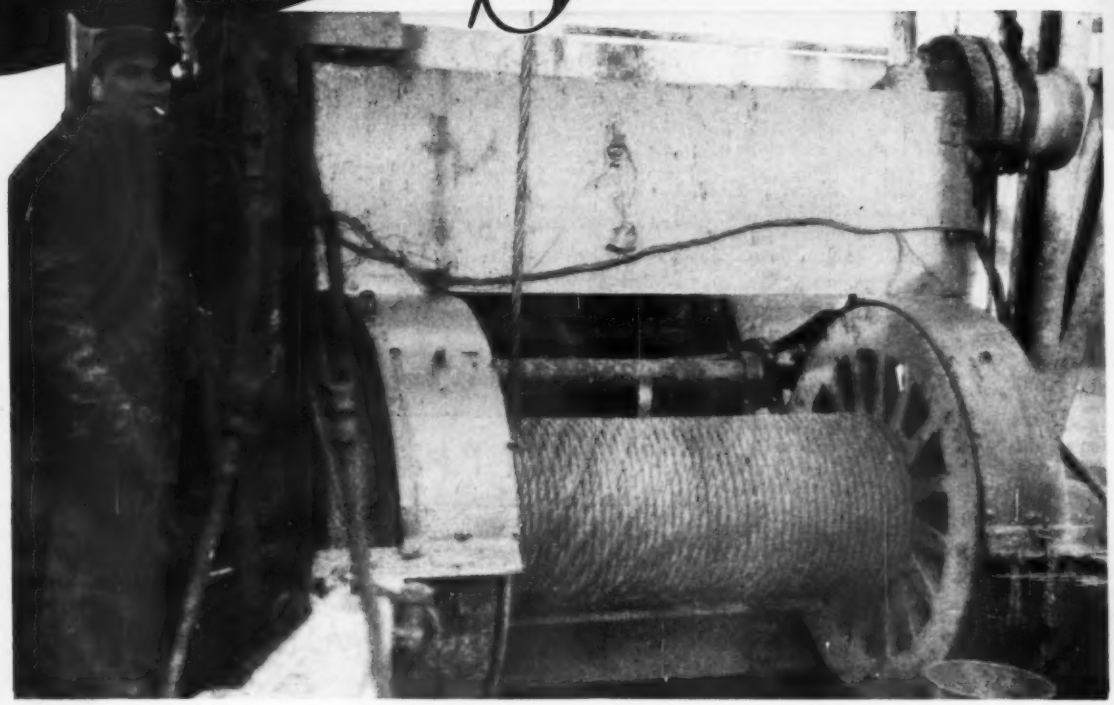
# Still the



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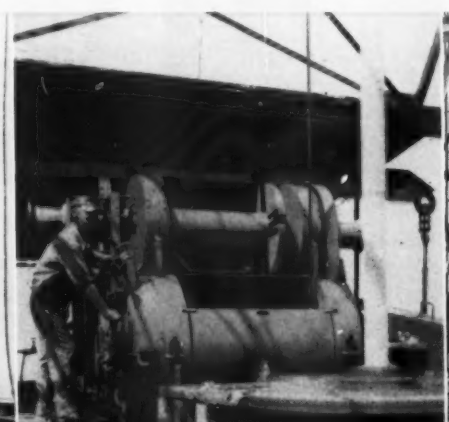
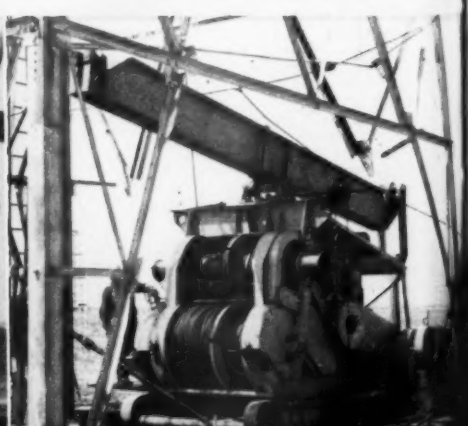
Model R with rotary table drive assembly drilling with 4½-inch pipe.



Model R with beam assembly completing a rotary drilled well with cable tools.



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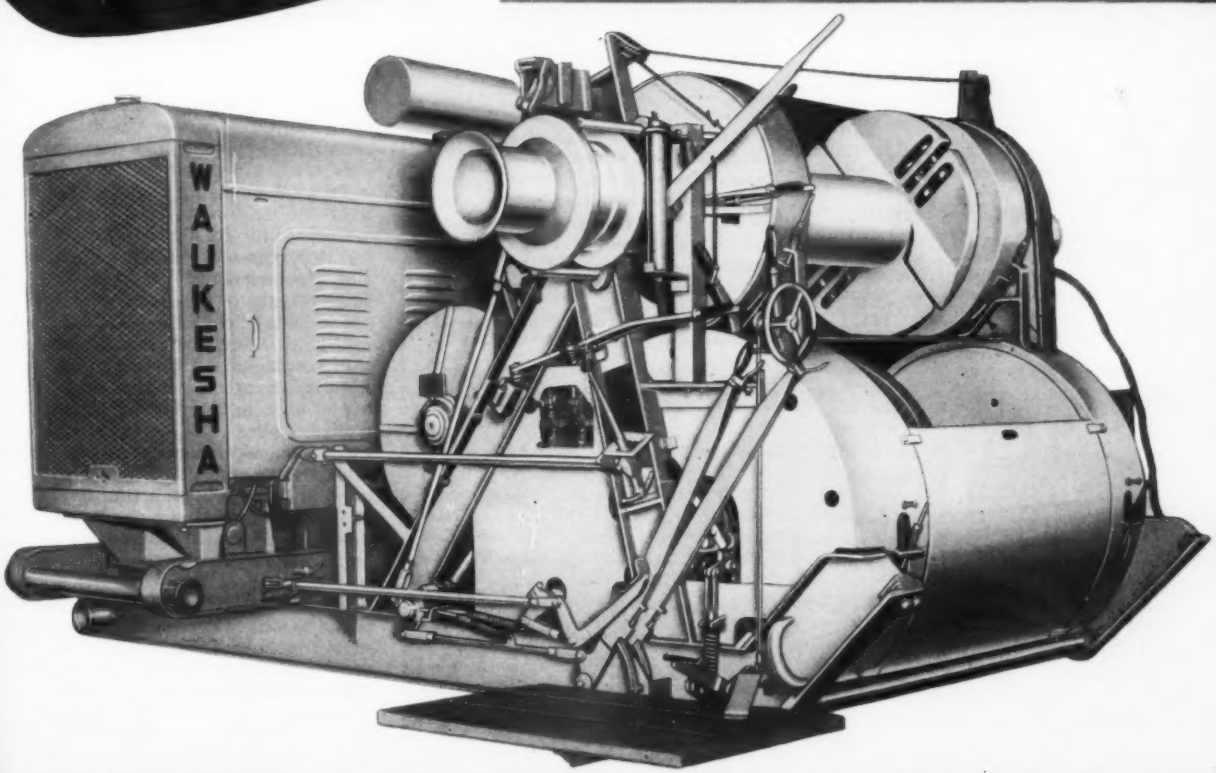


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# Treatment of Produced Salt Water—

## *prior to underground disposal in sand formations*

**by John V. Blair***

MANY of the operational problems on salt-water-disposal equipment can be solved by chemical knowledge. Corrosion, scale formation, precipitates arising from mixing water of different chemical nature, and entrained oil and gas are some of the factors involved in such problems. They are all encompassed within the scope of chemistry. In most cases chemistry of the problem does not involve original research. Usually, answers to the problems of determining the cause and remedy may be found in the literature.

If the produced water could be kept in a closed system exposed to neither air nor sunlight at any time while above ground there would be a minimum of chemical problems. Under such conditions the only problem would be the removal of suspended solids and entrained oil. However, this is not feasible in normal oil-field practice. In field operations iron is dissolved during pumping, the water is exposed to oxygen in the atmosphere, and it is subjected to cooling or heating which in turn results in changes in the chemical equilibria. To make recommendations for the solution of these problems, the chemist must be familiar with operating conditions and procedures.

Salt-water-disposal operations in East Texas oil field in several respects are easier than in many other places. Here the water is being used for repressuring the producing formation. Brine from the Woodbine sand is being returned to the lower Woodbine formation with no trouble from incompatibility. The Woodbine sand is of a highly permeable and homogenous nature. These characteristics of the formation greatly simplify many mechanical problems.

A total of over 500,000 bbl. of produced water is injected per day by various companies operating in East Texas field. The cost per barrel of disposal is lowered appreciably by installation of large plants. Most of Sinclair Oil & Gas Co.'s sedimentation and filter vessels are constructed of steel, using material salvaged from large storage tanks. The bottoms of the vessels are coated with asphalt cement. When placed in service, sides of the vessels are quickly coated with oil which has been in the brine. This oil coating protects the steel from corrosion. Tank steel of sufficient thickness is always used, even in the presence of highly corrosive conditions. Sides of the tanks are usually constructed of half-inch steel to provide a margin of safety.

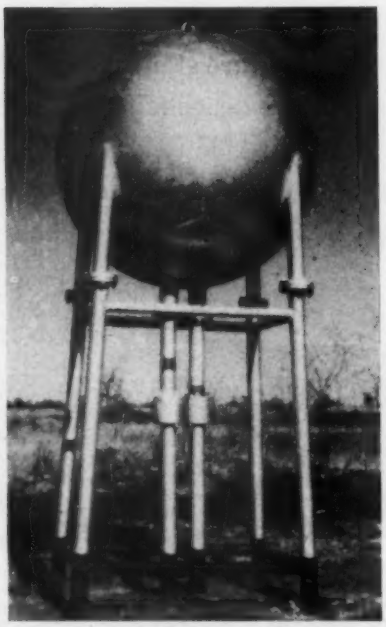
In several small systems handling only one lease and small quantities of water, skimming and filter vessels are built of redwood. However, construction factors limit this material to small plants.

By using corrosion-resistant pipe and heavy steel in the vessels, corrosion troubles have been eliminated or greatly reduced. Cement-lined tubing is used in Sinclair Oil & Gas Co. wells. Collar threads are protected by pressuring cement into the collar after the joint is made up.

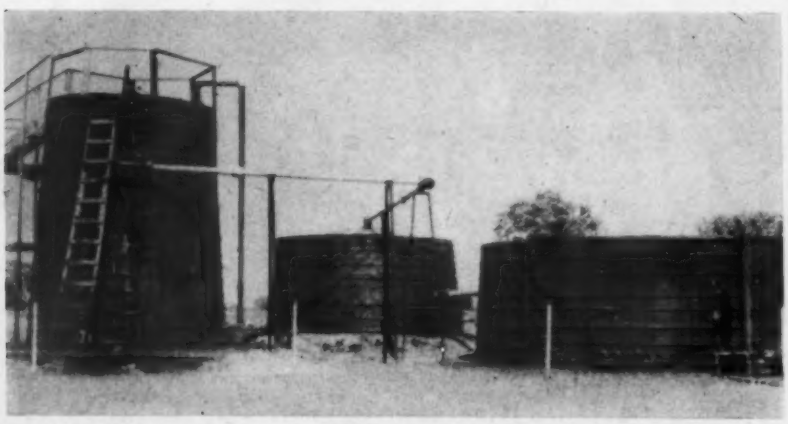
No scale or plugging problems have been experienced in Sinclair's East Texas operations. All waters in the area contain small quantities of bicarbonate or carbonate and are compatible. The scale which forms in the pipe lines has been easily removed by pipe-line "pigs" which precludes the use of chemical water treatment or other scale-prevention program.

Analysis of a typical East Texas salt water is shown in Table 1. The water consists mainly of chlorides of sodium and calcium. The only scale that would be expected from this water would be calcium carbonate, and only small quantities of this are encountered.

*Sinclair Oil & Gas Co., Tulsa. Summary of paper given at American Chemical Society symposium on "Conditioning Water for Repressuring Oil Fields and for Underground Disposal," Houston.



***PREVENTS GAS LOCKS.**—Sinclair Oil & Gas Co. has made a number of these unusual installations in Walnut Bend field, Cook County, Texas. These elevated spheres are used to remove dissolved natural gas from the salt water discharged from the pressure-type crude-oil treaters. Troublesome gas locks are thus eliminated from the salt-water-disposal lines via a vent opening in the top of the sphere.*



***OXFORD, KANS.**—This equipment handles 1,000 bbl. per day of salt water from Sinclair's operations. Salt water passes from the gun-barrel tank at left to the deration and settling tank in the center, and then to the gravity-type filter at right. Salt water is thus conditioned for disposal through water-injection wells.*

**TABLE 1—ANALYSIS OF TYPICAL EAST TEXAS SALT WATER**

| Constituents, p.p.m. | | Reacting values, per cent | |
|---|---|---|---|
| Potassium (K) | | Alkalies Potassium | |
| Sodium (Na) | 20,702 | Sodium | 43.87 |
| Calcium (Ca) | 1,294 | Alkaline earths | 3.15 |
| Magnesium (Mg) | 745 | Calcium Magnesium | 2.99 |
| Carbonate ($CO_3$) | | Weak acids Carbonate | |
| Bicarbonate ($HCO_3$) | 295 | Bicarbonate | 0.24 |
| Sulfate ($SO_4$) | 299 | Strong acids Sulfate | 0.30 |
| Chloride (CL) | 35,989 | Chloride | 49.46 |
| Barium (BA) | .... | ..... | .... |
| Strontium (SR) | .... | ..... | .... |
| $R_2O_3$ | 105 | ..... | .... |
| Silica ($SIO_2$) | 135 | ..... | .... |
| Total solids | 59,564 | Sp. gr. at 15.60 | 1,045 |

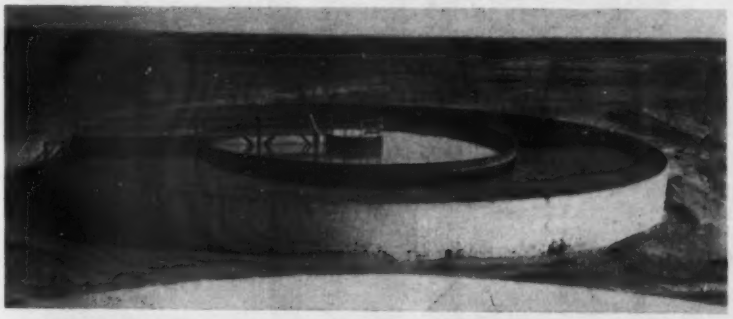
**Properties of Reaction in Per cent**

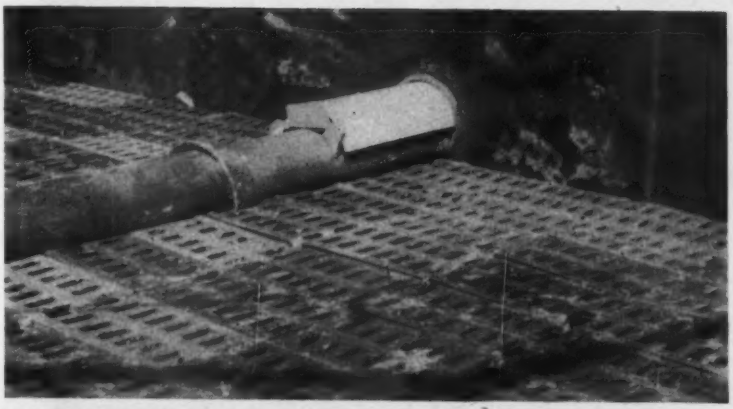
| | | | |
|---|---|---|---|
| Primary salinity | 87.74 | Chloride salinity | 99.40 |
| Secondary salinity | 11.78 | Sulfate salinity | 0.60 |
| Primary alkalinity | .... | pH 7.82 | ..... .... |
| Secondary alkalinity | 0.48 | Resistivity | ..... .... |

The method of waste brine treatment described here is based on established methods of water treatment; aeration, sedimentation, filtration. Due to a limited amount of technical help older and simpler treating methods are employed. For example, slow filters are used instead of newer, more rapid types. Roustabouts and pumpers operate the system.

In the treatment of salt water the main problem is to condition it so that it will not plug disposal wells. Obviously the method requiring the lowest cost for materials and maintenance is preferred. The higher initial cost in large sedimentation basins and slow filters is more than offset by operating the system without technical supervision and extra labor.

Probably the best criterion on which to judge the operating efficiency of a salt-water-treatment plant is the number of barrels injected per cleanout. In a paper by H. H. Elliston and W. B. Davis in A.P.I. Drilling and Production Practice, 1944, pages 138-140, a summary is given of 32 wells in the Woodbine sand in East Texas field, using various processing methods ranging from aeration, sedimentation, and filtration to complete chemical treatment. Injection average for these wells was slightly over 5 million barrels per cleanout regardless of the type of treatment used. The most complete chemical treatment showed no advantage over simple sedimentation and filtration, even





## Salt Water, 28,000 Bbl. Per Day

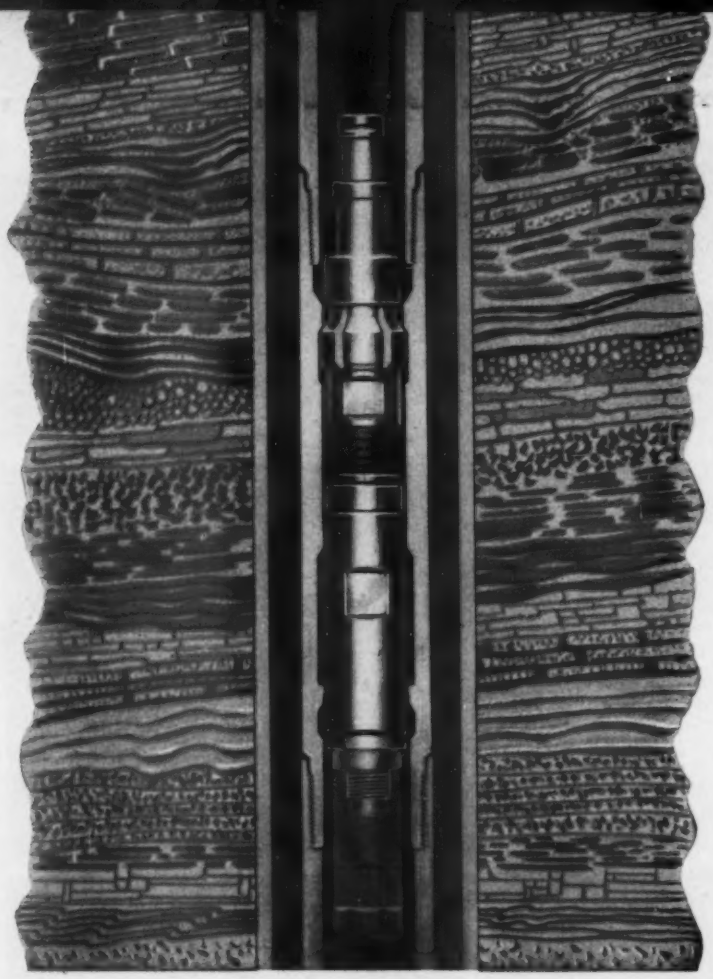
*These photos show the salt-water-handling facilities of Sinclair at Childers pool, Security fee lease, Nowata County, Oklahoma, a water-flood operation. This water-treating plant is constructed from two bottom rings of a 55,000-bbl. tank.*

*The circular compartment in the center of the tank is for sedimentation purposes. The incoming raw water is not chemically treated. Water passes from the center sedimentation compartment to the outer ring which is divided into two sections; these are designed as slow-rate gravity-type filters. The bottom portion of the two sections was filled with 30 in. of sand, then 24 in. of graduated rock, then pea gravel, ¼-½ in.; 1-1½ in. gravel; ½-4 in. rock.*

*The second photograph shows the slotted vitrified-clay blocks on which the sand-gravel filter bed is laid. Water-outlet piping is constructed of half sections of clay sewer tile. There are several of these, extending across the bed in radial fashion.*

*The second photograph was taken before the gravel-sand bed was laid; the third photograph was taken after the first layer of gravel was placed.*

*Sinclair has installed two of these water treatments at a Nowata water-flood operation and has another one under construction there; five have been built in East Texas field and one unit is under construction in Thrall field, Kansas.*



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though the cost per barrel is more than twice that of the simpler systems.

Records on Sinclair's Woodbine salt-water-disposal operations excel any of those in the Elliston-Davis report. In fact, cleanout tools have not been used on any Sinclair East Texas disposal well. There are 13 Sinclair salt-water-disposal wells in the field. These wells have an average of over 10 million barrels per well injected without a cleanout. The best record is that of one well where more than 23 million barrels of produced water has been injected without a cleanout.

In disposing of salt water by injection into a sand formation, the open-hole wall surface acts as a filter. In East Texas field this filter operates at a pressure of approximately 1,750 psi. under a temperature of 130° F. which in effect is a pressure filter.

A typical well in this field will have an open-hole filtering surface of less than 100 sq. ft. Due to the expense of cleaning open-hole filtering surfaces, it is believed that all possible care should be maintained to deliver clean water to the well.

As mentioned earlier, input of over 5 million barrels per well before cleanout is average. It should be pointed out that with 1 p.p.m. of plugging material in 5 million barrels of injection water, 5 bbl. of plugging material will be placed on the filtering surface. This is more than sufficient to plug up a filter of this area, or more than enough to fill the open-hole filtering section.

The material which could plug a filter are: (1) Entrained solids, (2) oil and b.s., and (3) solids which may be precipitated after treatment. The first two can be removed by sedimentation and filtration; the latter must be prevented by other means. There is one other contaminant often found in oil-field brine which gives considerable trouble in the operation of the treating plant and apparently sometimes in the well itself. This is entrained or dissolved gas in the brine which results in gas locks at times entirely stop the flow of water. This gas is removed by aeration.

In Sinclair's operations all reactions in the water go to or approach completion prior to filtration and the system is completely closed to air thereafter. The wells are close to the treating plants and at a rate of 5,000 bbl. per day there is less than 30 minutes' flowing time between discharge from the filter and the bottom of disposal well. Due to the short time and constant motion of the fluid, there is little chance of precipitation occurring. The only precipitate which might occur would be calcium salts due to cooling and loss of carbon dioxide.

Sinclair sedimentation basins are designed to remove all particles of

0.01 mm. or larger. The filter which immediately follows the sedimentation basins removes any floc present and filters out all of the entrained oil which would plug the formation. When the formation is considered as a filter, it is very evident how a small per cent of oil would plug it and slow the rate of water input. Within 15 to 60 days operation entrained oil causes excessive loss of head in the big, slow filters operated in East Texas. Area of the surface filter is many times that of the formation filter.

When waste water is discharged from a battery, it is transported direct to the treating plant, through a corrosion-resistant pipe line constructed either of cement asbestos or cement-lined pipe. The lines are of a gravity flow type when at all possible, since pumping of the salt water results in high maintenance costs.

In a gravity system where the hydraulic head is only that produced by the tank battery, the entrained or dissolved gas comes out of solution, collecting in the high parts of the line and resulting in gas locks which reduce the flow of water.

Figures on amounts of gas in formation waters obtained by L. C. Case (see Table 2), show the volume of gas carried in solution exceeds the volume of water at atmospheric conditions. Most of this water-dissolved gas is removed in the water knock-out tanks but enough is carried through to give trouble in gravity lines. These gas locks may occur anywhere in the system, often without apparent reason. Such occurrences in East Texas have resulted in the placing of vents within a foot or so of the bottom of the siphon although the siphon is vented to the air at the top with a 2-in. pipe. The lower vent blows a constant stream of gas 24 hours a day. These gas locks occur whenever conditions make it possible for the gas to come out of solution and collect. A freak condition where the gas lock occurred at the low in the pipe line has been observed. Normally vents are placed on all the "highs" in the Sinclair systems which introduces greater possibility of aeration.

In the case of pressure treaters, vents are always necessary and in connection with them, volume or surge tanks are used. Water is discharged into this tank which is vented at its top for release of the gas. This volume tank provides the only deliberate aeration given the water prior to its reaching the treating plant. A discussion on the engineering design of Sinclair's East Texas salt-water-disposal pipe lines is given by Elliston and Davis in A.P.I. Drilling and Production Practice, 1944, pages 122-145.

The other chemical problem which occurs in the gathering system is the deposition of scale in the pipe line. In East Texas this scale is a carbonate formed due to the loss of carbon dioxide, plus any b.s. or foreign material in the fluid. This type of scale can be prevented by the use of phosphates and other control methods.

Salt water entering the treating plant goes first to a sedimentation tank. The oldest and simplest method of water treatment, sedimentation is so little understood that process design is mainly on a rule-of-thumb basis.

All municipal water systems maintain very high standards of purity to

**TABLE 2—DISSOLVED GAS IN FORMATION WATER**

| State— | Sampling depth (ft.) | Psi. pressure at sample depth | Temp., °F. at sample depth | Total gas, cu. ft. per bbl. | Total hydrocarbon gas cu. ft./bbl. |
|---|---|---|---|---|---|
| Oklahoma | 6,864 | 2,131 | 158 | 4.06 | 3.99 |
| Oklahoma | 3,714 | 1,625 | 127 | 5.73 | 5.71 |
| Michigan | 2,878 | 1,300 | 84 | 7.00 | 6.90 |

Personal communication, L. C. Case, Gulf Oil Corp., Tulsa. Samples were taken at formation pressure and temperature, flashed to the atmosphere at 150° F. and the evolved gas measured quantitatively.

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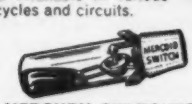


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produce potable water, and the plants are built to last a generation. These high standards and long-life equipment make for a high initial cost which may be absorbed over 20 or 30 years or longer. This is not true of salt-water-disposal operations. Here the only requirement to be met is that the water shall not plug the formation. Color, taste, odor, pH, etc., have no effect as such and are ignored unless such tests indicate some unfavorable reaction. Many disposal systems have a life of only 10 years or so, depending on the life of the oil field. Economy does not permit installation of the permanent, elaborate systems common in municipal practice.

Design of the sedimentation tank or basin is based on the size of particle which it is to remove. No formula is known wherewith formation porosity and permeability may be related with particle size. Therefore, a rule-of-thumb standard is set up for the minimum particle size which is to be removed. This size is 0.01 mm. diameter or larger. Elliston in A.P.I. Production Practice gives an example of the calculations on the design of this tank.

The water is discharged into the sedimentation tank via a weir-type spreader located around the outer edge of the tank. Thus the water has a free fall through the air, which besides aerating it releases more of the entrained gas.

Aeration has two primary chemical effects on oil-field brines: (1) Oxidation of the iron compounds to the insoluble iron hydroxide, and (2) the release of carbon dioxide, resulting in the precipitation of calcium carbonate. These two products will give considerable trouble in the injection well if not removed prior to injection.

Many companies use alum and lime treatment to precipitate these compounds; however, Sinclair operations depend on sedimentation and slow filters to remove them. Chemical treatment will give more trouble than it is worth if not properly operated. One of the common faults of chemical treatment is that the plant generally has insufficient storage capacity to carry the reaction to completion before injection. In many fields the incoming water is produced from several formations for varying periods of time. This results in constantly changing compositions and unless trained personnel are on duty at all times the type and rate of treatment is not coordinated with the incoming water.

### Well Troubles

The chemist can often give important assistance in the operation of disposal systems by determining what type of material is plugging the well and suggesting methods for its removal. Although there is no serious trouble with well plugging in the East Texas area, it does occur in other areas. There are several conditions which can plug a well: (1) Scale formation, (2) oil or b.s., (3) entrained solids, (4) sulfur or sulfur compounds, (5) gas locks, and (6) bacteria. With careful design and operation any of these troubles can be controlled.

Scale formation due to mixing of waters, if unavoidable, must be settled out prior to injection. Carbonate scale due to loss of $CO_2$ should be settled out in the treating plant, but any carbonate scale which enters the well and plugs the formation can be removed by acidizing the well. However, any strontium or barium sulfate scales which form in the well may result in trouble which will require drastic expensive remedial work outside the scope of chemistry. Chemical analysis of the waters should be made prior to injection and the chemist should warn the designers when these troubles may be expected. Also the chemist may be able to suggest scale or corrosion inhibitors. Gas locks are controllable by many well-known methods and hardly fall into the field of chemistry.

When b.s., entrained solids, or sulfur compounds plug the formation the chemist may be able to suggest a


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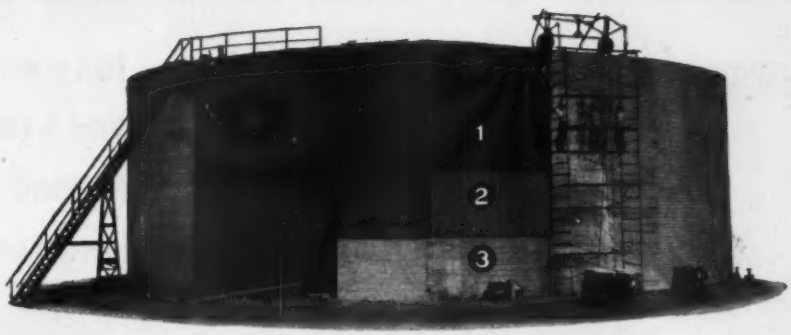


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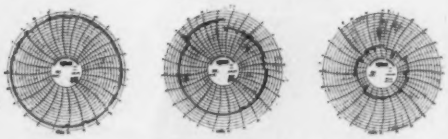

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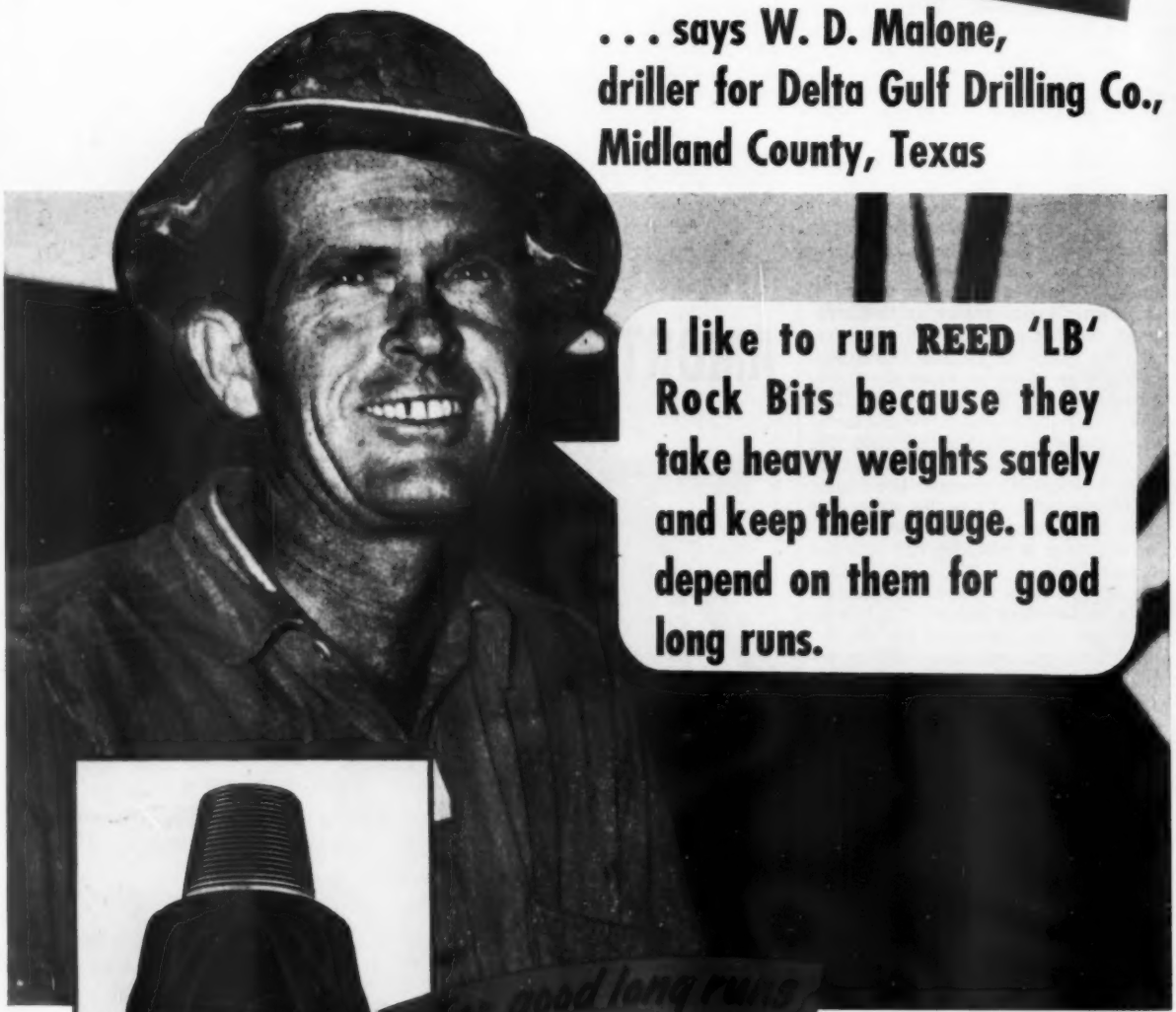

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solvent or chemical for cleaning the well. Plummer and Walling report very little action from sulfate-reducing bacteria in less than 10 days at normal temperatures. Action of bacteria may be considered negligible in a salt-water-treating plant.

There are some wells in western Kansas where injection is being made into the Arbuckle granite wash. These wells seem to give no trouble regardless of how they are treated. This is due to the fractures and large pores in the formation. However, others never do become satisfactory injection wells. In design or operation these factors should be taken into consideration.

In all cases skimming and sedimentation processes are required for dependable operation. Filters are not used in many areas although they would be beneficial in most cases. In many old fields economics will not justify the investment in a complete system and in these cases only sedimentation and skimming are employed by Sinclair. Where economics justify, the plant should be designed with sufficient size to take care of all expected water, with as complete a treating system as needed.

### Chlorine Treatment

In Sinclair's East Texas field operations gaseous chlorine is used regularly in all of its salt-water-disposal wells. The method works only on wells which will take water by gravity at a fair rate. Chlorine is injected by pinching the input back to where the falling water will create a partial vacuum at the well head. When the reduced pressure is as low as practical the valve on the chlorine cylinder is opened. The chlorine injection rate is as fast as possible without destroying the vacuum. The flow of chlorine is continued until the vacuum, as shown by gage, starts to increase (about 15 minutes in East Texas). The chlorine is then cut off and the water valve is opened wide to flush the chlorine into the well formation.

No appreciable corrosion has been encountered with this method where injection water rates are high enough to flush out the chlorine. However, some trouble has been experienced where the chlorine stood too long before flushing. Chlorine injection should be avoided on badly rusted pipe since it will dissolve the scale and show up leaks which have not broken through the pipe walls because of the plugging action of the scale.

In the East Texas area common practice is to inject 40-50 lb. of chlorine in about 15 minutes. This treatment is applied when the rate of input slows up, or the pump pressure increases, normally every 15-60 days. This amount of chlorine when injected rapidly will often double the rate of input.

Calculations based on the velocity of the input water show the reaction is almost instantaneous on arrival at the formation. The vacuum gage will show a decided increase at about the instant the chlorine reaches the formation. Vacuum after treatment will often reach 28-30 points. Further treatment after the initial reaction apparently gives no further immediate results. An exception has been noted in one or two new wells where repeated chlorine injections improved the well. This chlorine treatment is seldom used more often than once a week and in most places only occasionally.

Reaction of the chlorine at the well filter face has not been determined, but there are three possibilities to consider:

1. Acidization—Chlorine forms hypochlorous acid in water solution.
2. Oxidation—Chlorine is a very powerful oxidizing agent.
3. Bacteria removal.

An interesting situation is that in some wells where hydrochloric acid may be ineffective, chlorine is effective, and in other wells the opposite is true. In those wells where acid is most effective, the removal of scale probably occurs. Where chlorine is most effective some other reaction


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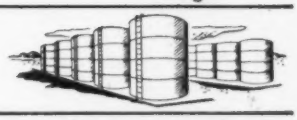

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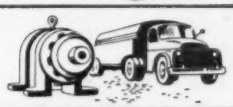

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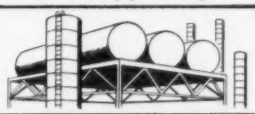

**Series 400—Vinyl Base Coatings**
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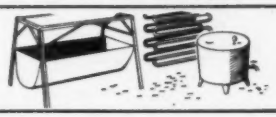

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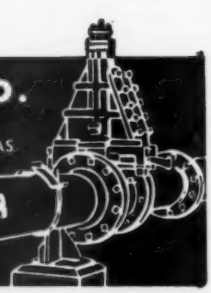

**MICRO-METER**

probably accounts for the results. Chlorine is inexpensive and requires no down time.

In East Texas field chlorine is far more effective than HCl, shooting with nitroglycerin, or cleaning out with tools. The 15-minute treatment previously described returns the well to its original condition and in some cases, the condition is bettered. In a few cases new salt-water-disposal wells have been given large intermittent doses of chlorine at the very start of injection with very good results in increasing the rate of water injection. In one of these cases, this expedient has removed any need of pumps. Although there may have been a natural improvement in the well during the first few weeks, chlorine treatment is believed to be beneficial.

All of Sinclair's East Texas salt-water-disposal wells have improved with use, over the years, and all indications point to the repeated chlorine dosage as an important factor.

### Other Methods of Treatment

In western Kansas, where considerable sulfur and sulfur compounds must be contended with, chlorine has not been as effective as in Sinclair's East Texas operations. This would be expected due to the chlorine demand of hydrogen sulfide in the Kansas brine and the resistance of some sulfur compounds to reaction with hypochlorous acid or chlorine.

However, in western Kansas, carbon bisulfide has recently been used with good results. In these cases injection was stopped and 2 or 3 bbl. of $CS_2$ were poured into the tubing before resuming injection. The carbon bisulfide apparently acts as a solvent for the b.s. and sulfur compounds on the formation surface.

These Kansas wells are usually in limestone or basic granite-wash formations. The injection water-treating systems in this area are not equipped with filters which would alleviate much of the trouble from sulfur compounds. However, there are a number of western Kansas wells which have given no trouble when sedimentation only is employed in semiclosed systems.

Probably the only condition where carbon disulfide is indicated is that where the plugging material is sulfur or sulfur compounds. However, $CS_2$ should be a good solvent where the plugging material is b.s. It is understood that carbon disulfide has been similarly used in East Texas wells, with bad after effects. No attempt has been made to use $CS_2$ in Sinclair's East Texas operations.

Butane has also been used as a solvent when b.s. was the plugging material. Butane washing gave good results in several wells but pumping of the material has been banned by various company safety departments, resulting in the abandonment of butane for this purpose. **Any use of butane or carbon disulfide should be made only by trained personnel, due to inherent dangers in handling.**

Hydrochloric acid is also used quite often to clean out salt-water-disposal wells, with best results in limestone formations. This type of treatment is well known and needs no further discussion, except to point out that larger quantities are used in salt-water-disposal wells than is used in normal oil-field operations.

Any remedial well treatment is composed of two costs, direct and indirect. The indirect cost is shutdown time, and if a number of producing oil wells are shut down, the loss of oil adds up to a large sum. The direct cost of moving in tools will be several hundred dollars a day, and the time involved may run from several days to a period of months.

### Bibliography


1. H. H. Elliston, Salt-Water-Disposal Systems, A.P.I. Production and Drilling Practice, 1942, pp. 98-117.
2. H. H. Elliston, and W. B. Davis, A Method of Handling Salt-Water Disposal Including Treatment of Water, A.P.I. Production and Drilling Practice, 1944, pp. 122-146.
3. Personal Communication, L. C. Case, Gulf Oil Corp., Tulsa.
4. L. C. Case, Scales in Oil-Producing Equipment, The Oil and Gas Journal, September 28, 1946, and October 5, 1946.
5. Plummer and Walling, Laboratory Investigations of Chemical Changes in East Texas Salt Water, A.I.M.E., March 1946.

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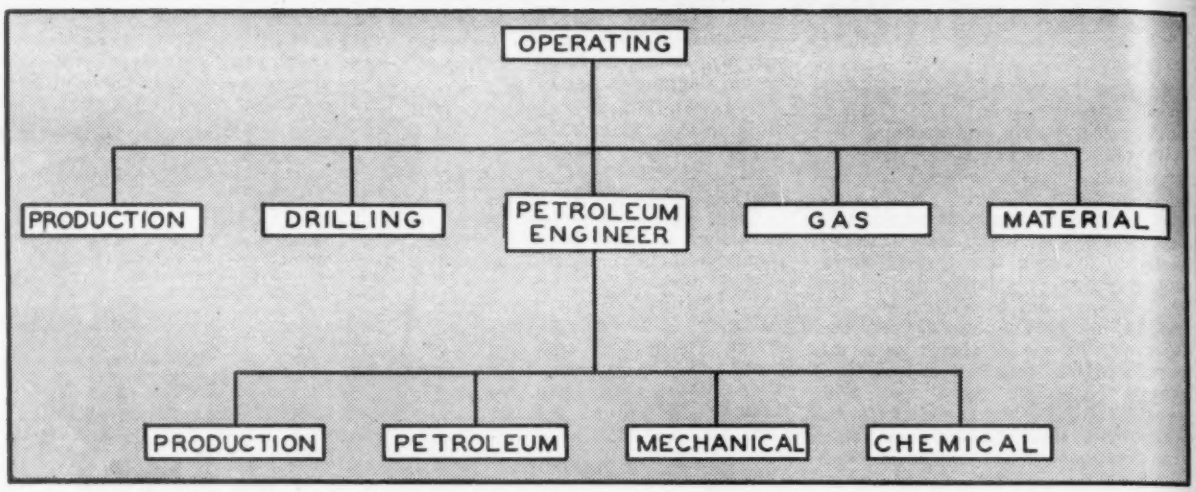


*Fig. 1—Role of engineering department in the operating organization of Atlantic Refining Co.*

## *How Atlantic Refining Co.'s oil-producing department functions in*

# PLANNING CORROSION STUDIES

**by Joseph A. Kornfeld**
District Editor

COORDINATION of field engineering with laboratory studies, emphasis on cost economics, and continuous progress control feature the approach to corrosion problems as employed by Atlantic Refining Co. at its Dallas laboratory.

Research effort is directed into the more feasible channels, duplication of effort is avoided, and corrosion studies are balanced with other field-problem endeavor. Responsibility is focused directly on certain groups, progress reports are made, and each project carried to logical conclusions. This comprehensive control tends to bring about a maximum return on the research dollar.

**Corrosion—a preventable disease.**—Rather than look on corrosion as a cancer, Atlantic management considers the problem a preventable disease. The over-all thinking of this organization may be summed in the phrase: anticipate the problem before it occurs. So states Harrell L. Bilhartz, Dallas, Atlantic chemical engineer, in a recent address before the Houston section of the National Association of Corrosion Engineers.

**Organization charts.**—The role of the engineering department in the Atlantic operating organization appears in Fig. 1. As shown in Fig. 2, all corrosion problems are organized along the major personnel functions of (1) district field engineers, (2) mechanical-engineering group, and (3) chemical-engineering group. All these are responsible to B. E. Moir, the chief petroleum engineer.

**Concept of problem.**—The corrosion problem may originate in any of the three following ways:

**By the district field engineer.**—From observation, the district field engineer reports where corrosion is severe. There may be a field in his district where corrosion has cut the life of a string of tubing to as short as 9 months, and the like.

**By the mechanical engineering group.**—This group is cognizant of those environments where corrosive action is accelerated and can recommend equipment which offers a high degree of resistance to corrosion, such as high-nickel-alloy tubing and rods.

**By the chemical engineering group.**—This group uses (1) analytical data and (2) personal contacts in the conception of a corrosion problem. Analytical data may be scale and corrosion products, water analyses, and correlation diagrams which enable these technologists to recognize the environment of corrosive conditions. Personal contacts are those made by the chemical engineers with those of other companies. The technical-practices committees of the National Association of Corrosion Engineers are invaluable sources of contact.

**Preliminary study: mechanical group.**—Following the concept of the problem itself, the next step is a preliminary survey by the mechanical-engineering group. The purpose of this survey is (1) to define the scope of the problem and (2) to determine the cost of the problem and to limit the amount. This report goes next to the chemical-engineering group for review.

**Preliminary study: chemical group.**—The next phase of the procedure is the preparation of a preliminary study by the chemical-engineering group. Using the preliminary survey of the mechanical-engineering group, the chemical engineers ascertain the probable technical success factor and the priority rating of the project. The technical aspects are reviewed. An estimate of the costs of investigation is made for management.

A conference is then held between the senior chemical engineer and the senior mechanical engineer to determine the degree of attention which the project may justify. In the event of approval by the chief petroleum engineer and successively by top-level management, the project is discussed again in the department from the standpoint of: (1) length of time required to do the work, and (2) intensity of investigation.

**Progress report.**—After approval by chief petroleum engineer, the project is put into motion. Direct responsibility is then assigned to the chemical-engineering group for progress on the problem. This group then commences the next step which is the compilation of data both in the laboratory and field.

**Laboratory phase.**—Atlantic uses both the theoretical and simulated condition approach in the laboratory. Tests are run under conditions to duplicate actual field conditions with-

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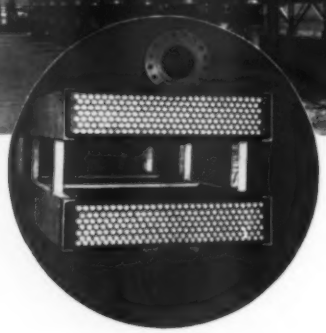

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in practical limits. This approach has grown within recent years. The theoretical approach involves chemical concepts and the susceptibility to corrosion of metals of various chemical compositions and treatments.

**Field phase.**—Both experimental work as well as the records and personal knowledge of field personnel are employed in this phase. Although field experiments offer the "proof of the pudding," at best they are time consuming. The other source lies in the field and field records not available in central headquarters. No investigation of corrosion problems can be complete without an investigation in the field.

The areas of high corrosion are studied on the ground as the chemical engineers discuss practical problems with the pumper and roustabout. Most of the field operating personnel are always interested in improving the life of equipment and in assisting in any way that will lengthen the life of equipment.

The value of trips to the field lies in the fact that they tend to fill the gap between theoretical studies and field experience. Advances stem from cooperation between the field personnel and the chemical-engineering group.

**Field samples.**—In the field, the chemical engineer records his personal observations. Samples are taken of corrosion deposits. Often as much as 600 ft. or more of badly corroded tubing has been taken off of the pipe racks and shipped to the Dallas laboratory for a series of tests. In one case a complete christmas-tree assembly, which was badly corroded, was shipped into the chemical-engineering laboratory for study.

**Field contacts.**—Usually, in an area which has shown a high degree of corrosion, the problems are not necessarily confined to one individual company. At this point a discussion held by the engineer with offset operators may prove fruitful of ideas which may be employed in correction of the problem, or serve to prevent its recurrence in future development. These contacts can bring to light a number of conditions where it may be of mutual advantage to the parties concerned to exchange ideas on corrosion conditions and the application of remedial measures. Field-wide studies often prove more useful than an analysis of a single well or lease.

**Interpretation of data.**—Obviously, the data obtained both in the laboratory and field are employed by the staff for the next phase of the study: interpretation of the data. At this stage the correction of the problem may appear impossible. Important data may be lacking in the field. The time, trouble, and expense of collecting it may discourage further work on the project. On the other hand, enough new findings may justify continuance. Here the senior chemical engineer may request more justification to carry forward the project.

**Preliminary conclusions.**—The project is now ready for further organized test work. Carefully controlled field trials and pilot-model studies are specified by the chemical-engineering group and conducted under its supervision. The value of the study must first be sold to the roustabout and the pumper to the end that the project will be given the best care in the taking of measurements and collection of field data.

At this stage the project may be narrowed down to two or three possibilities. Practical aspects of the

*(Continued on page 196)*

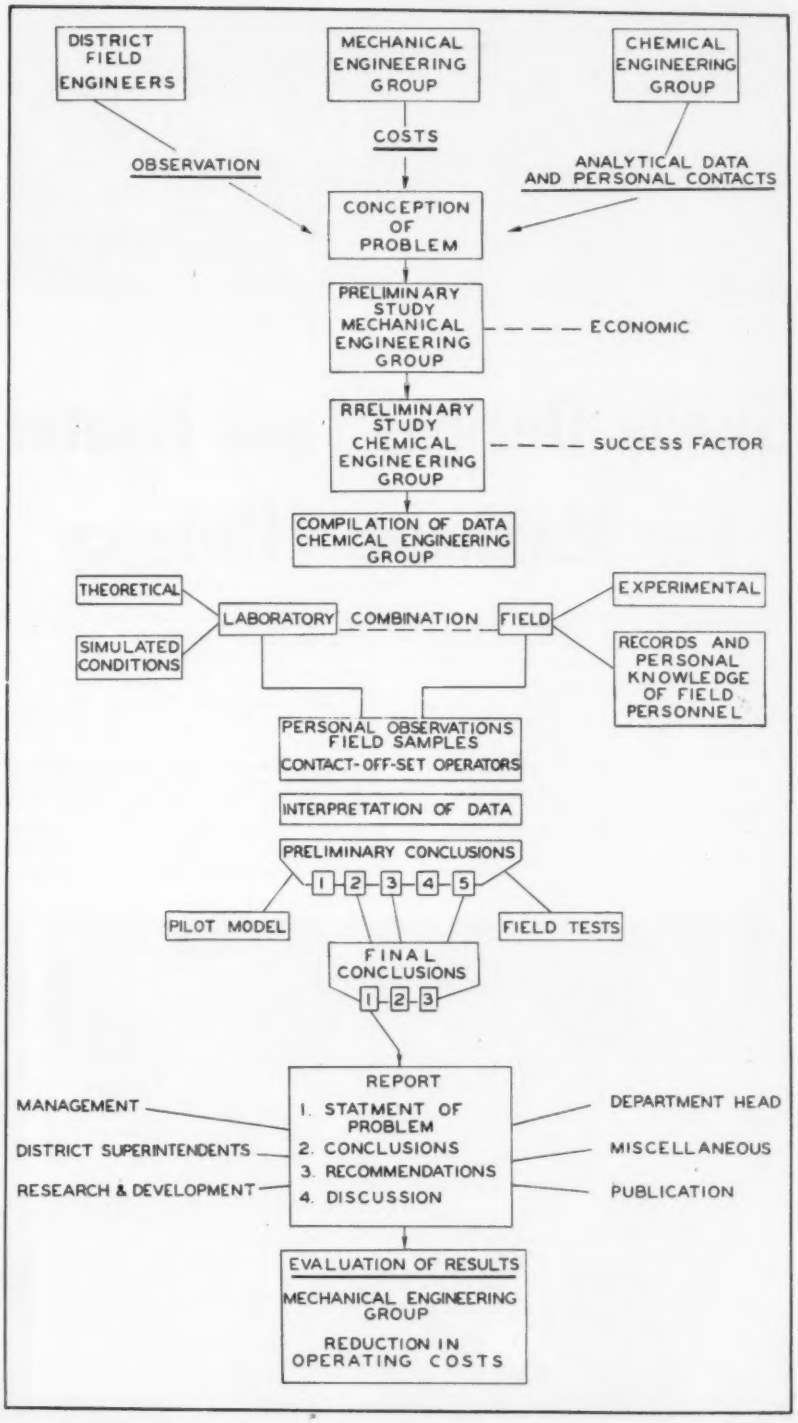


***Fig. 2—Procedure for handling a corrosion study in the engineering department of Atlantic Refining Co. at Dallas.***



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*Steam supply and condensate return lines for tank heater at Skelly Oil Co.'s El Dorado, Kans., refinery.*

# Skelly Designs Tank Heater For Maximum Efficiency

REFINERY division engineers of Skelly Oil Co. have developed a tank heater that replaces the conventional pancake and endless-coil types commonly used in heating heavy products. The new heater contains 26 elements which are installed in each tank at the El Dorado, Kans., refinery, where heavy residuum, or asphalt, is stored. The first unit, placed in a small fuel-oil tank at the refinery boiler plant, performed so successfully that all other tanks handling heavy oil are being equipped with the same type heaters.

The heavy-oil storage tanks in Skelly's El Dorado refinery average 50 ft. in diameter. Heating elements for these tanks range in length from 47 ft. for the longest down to 29 ft. for the shortest. (See accompanying drawing.) The different lengths are explained by the fact that practically all of a tank's floor area is heated. At the point of greatest diameter, (center line of the tank) are the two longest heater sections. Lengths of the other elements are progressively shorter on both sides of the tank's center.

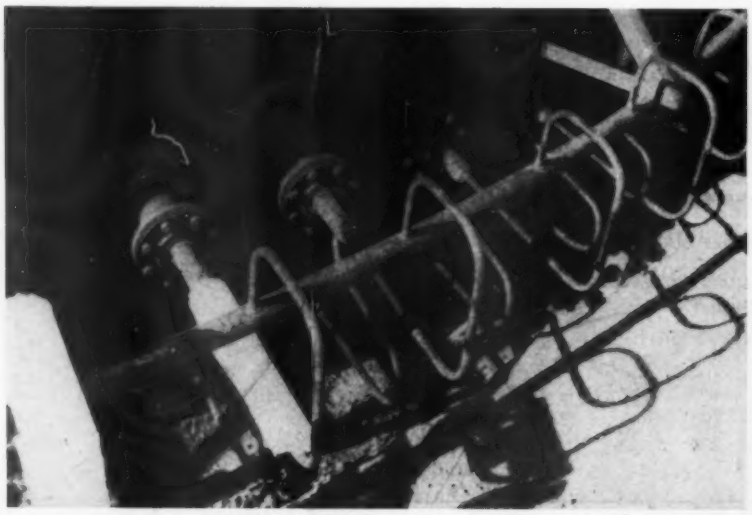
The heating elements are installed parallel to each other on a center spacing of 18 in. The group is located on a supporting structure which places the heater approximately 2 ft. above the tank's floor.

### Details of Supporting Structure

The supporting structure consists of three structural angle sills located at right angles to each heater section so that the section is supported at three separate points. Three-inch pipe columns, resting on the tank bottom, position the heater at the desired height. Heater sections are held to the supporting sills with ¼-in. round steel bars formed to a radius of 1½ in. and welded to the sill on each side of the 2-in. heater tubes.

A tank is prepared for installing the heaters by thoroughly cleaning and steaming, so welders and pipe fitters may work inside the vessel in safety. Openings are cut in the tank wall on 18-in. centers for the heaters. These holes, of varying shapes depending upon their individual positions, receive 4-in. pipe nipples. In the exact center of the heater assembly, where the two longest sections are installed, the holes are circular, but as they are moved across the tank for the progressively shorter heater sections, the holes become elliptical. Although shape of the holes become wider ellipses as they are located further from the tank's center they are made no larger than necessary to accommodate the 4-in. nipples.

The 4-in. nipples are trimmed at the ends entering the tank to conform to the contour of the inside wall, where they are attached by welding. The holes in the tank are reinforced with 9-in. diameter plates, cut from



*Left: A portion of steam and condensate system showing method of connecting heater element terminals to headers. Right: All steam lines up to the inlet connection to the heating element are insulated.*

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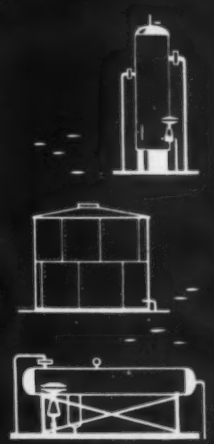

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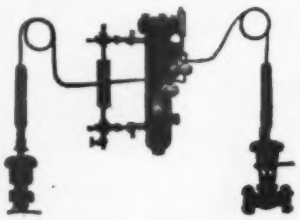

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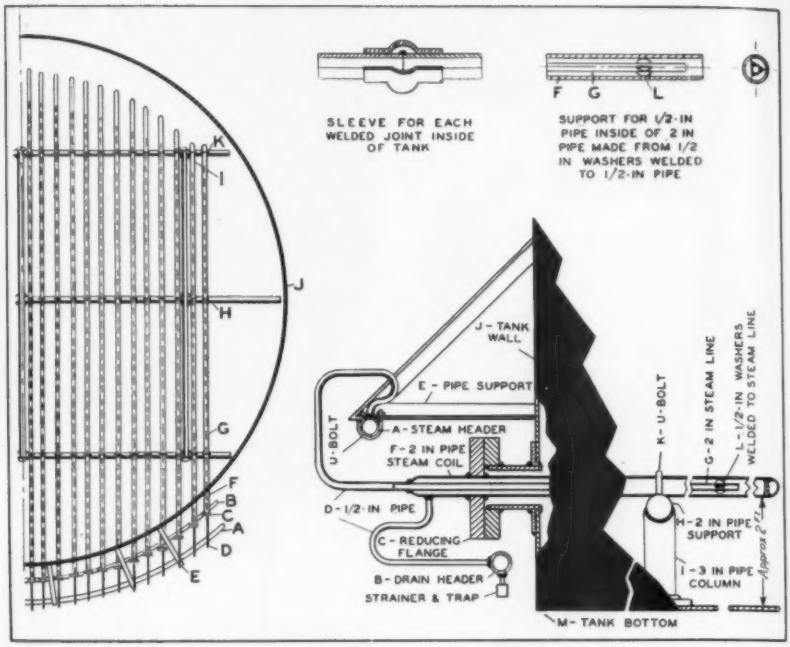


*Schematic arrangement of heating elements, method of installing elements in tank, and design details on element construction.*

½-in. stock, and shaped to fit the tank wall and cut to receive the 4-in. nipple. These reinforcing plates are welded to the tank wall and to the 4-in. nipples.

**Heating Elements of 2-In. Pipe**

The heating elements are made of 2-in. pipe, and where two or more joints are required to form a single run, the joint is welded and reinforced. The joint is then protected with a welded sleeve. Ends of the elements which extend into the tank are closed by welding or with a 2-in. bull plug which is welded to seal the joint. The 2-in. heater pipe is also welded to the reducing flange so the outer end of the 2-in. pipe will be approximately 2 ft. from the wall of the tank.

A ½-in. pipe is placed inside of the 2-in. heater and extends to within 30 in. of the end of the larger pipe. The 2-in. pipe is supported in the center of the 2-in. heater pipe with welded washers placed approximately ¼ in. from the open end of the ½-in. pipe. The outer end of the 2-in. pipe is swedged to receive ½-in. steam inlet pipe which is connected by welding. The ½-in. steam pipes are connected to a common header.

Condensate is drained off through a second ½-in. pipe, welded to the under side of the 2-in. heater pipe. This line is connected to a drain header serving the entire group of heating elements.

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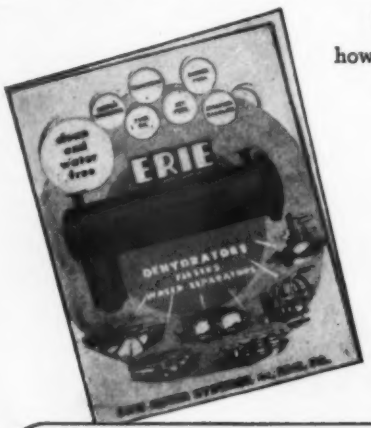


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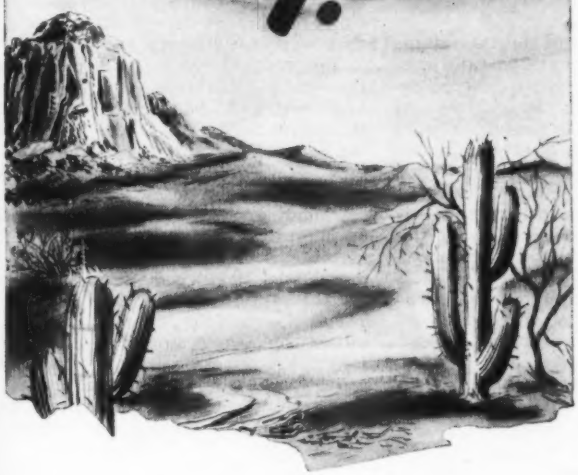

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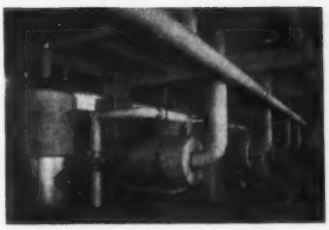

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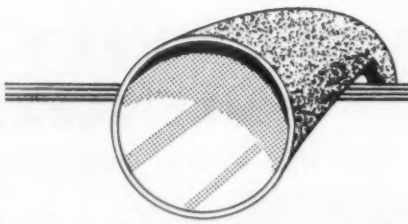


# CORROSION and its control

## Basic Principles of Cathodic Protection

WHENEVER corrosion takes place at the surface of metal in contact with a continuous body of an electrolyte, it is amenable to control by cathodic protection, at least theoretically. This is not always the most economic solution since it may be possible to control the corrosion by substituting a more resistant metal or alloy, by interposing a protective coating, or by altering or conditioning the electrolyte. Very frequently, however, cathodic protection, either alone or in conjunction with a protective coating, is the most economical means of mitigation.

Cathodic protection is possible because of the electrochemical nature of corrosion. The only way in which atoms of the metal may detach themselves from the surface and enter the solution is in the form of positively charged ions. These ions cannot form unless there are positive charges available in the solution which, by attachment to the atoms of the metal, convert them into ions. Wherever there is water there are some hydrogen ions formed by its dissociation, and these ions are always available to give up their charges to the metal atoms. The number available depends largely upon the degree of dissociation of the water, and this in turn is influenced strongly by the kinds and amounts of substances dissolved in the water.

Regardless of the number of hydrogen ions present, and regardless of the ability of the solution to keep supplying them as they are used up in the corrosion process there will be no positive metal ions formed if an adequate supply of electrons (negative charges) is maintained at the surface of the metal, to combine with and thus neutralize all the positive charges that drift or are attracted that way on hydrogen ions.

The rest of the circuit—how the current gets into the solution, how and where it leaves the protected structure, and what is the nature of the source from which it is derived—are details which differ markedly from one installation to another; cathodic protection is the process taking place at the boundary of the metal, where the maintenance of a continuous negative charge prevents the formation of any metal ions.

This continuous charge is maintained by connecting the structure to some source of energy which is capable of supplying direct current. The amount of current which must be supplied to maintain this continuous negative charge is determined by the rapidity with which the charge is used up in neutralizing hydrogen ions, and in leaking uselessly away because of the lack of perfection of insulation. Much current will flow to surfaces not particularly in need of protection; this wastage is unavoidable.

In addition to a source of direct current, the negative terminal of which is connected to the structure to be protected, some arrangement must be made to complete the circuit by connecting the positive terminal to the electrolyte—the ground. if a pipe line or tank bottom is the structure; the water inside a tank being protected; or the sea when an offshore platform is the object of protection. When such an arrange-

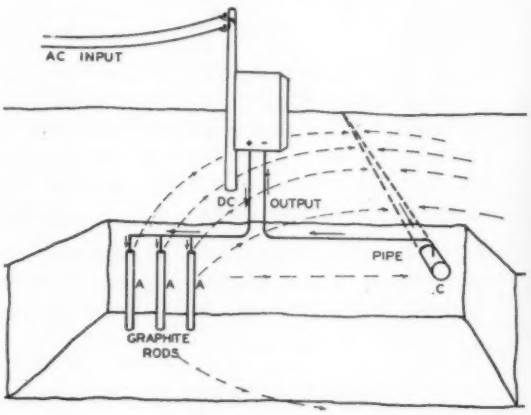
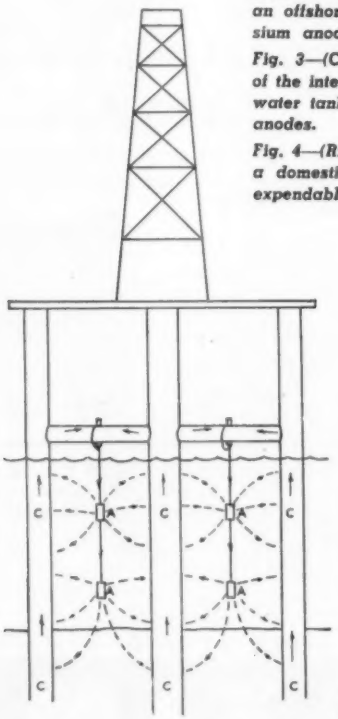


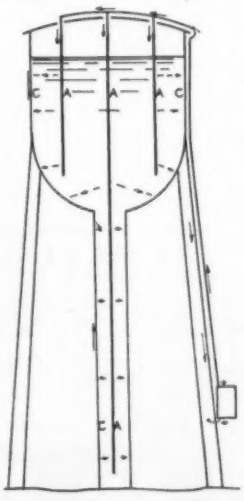

*Fig. 1—(Right) Cathodic protection of a pipe line, using a rectifier and graphite rod ground bed.*

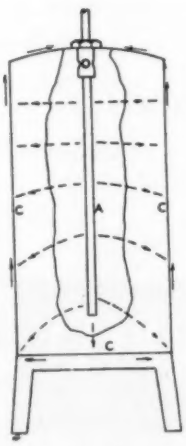
*Fig. 2—(Left, below) Cathodic protection of an offshore drilling platform, using magnesium anodes suspended in the sea water.*

*Fig. 3—(Center, below) Cathodic protection of the interior wetted surface of an elevated water tank, using a rectifier and aluminum anodes.*

*Fig. 4—(Right, below) Cathodic protection of a domestic water heater by means of an expendable magnesium rod anode.*

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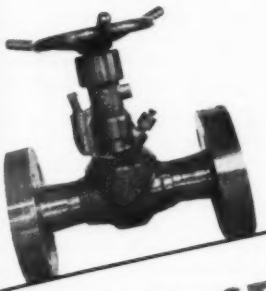

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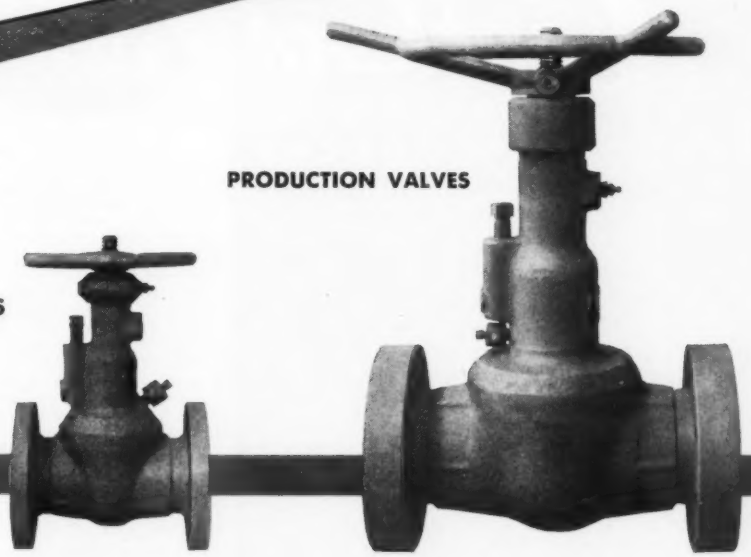

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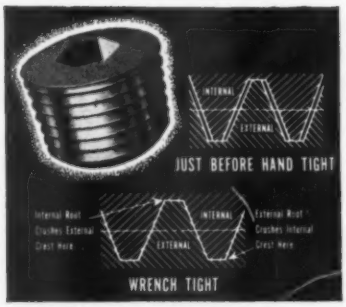


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ment exists, we have an electrolytic cell; the terminal through which current enters the electrolyte is the anode, and is usually subject to corrosion by the current; the terminal through which the current leaves the electrolyte is the cathode, and is protected from corrosion by the current, or by the continuous negative charge; whence the name cathodic protection for the process.

The protected metal structure may be a pipe line, a ship, the interior of a water tank, a steel bulkhead, a heat exchanger, a butane tank, a domestic water heater, or even the metal parts in the tank of a water closet. The electrolyte may be soil, sea water, fresh water, brackish water, brine, or some process liquid —any medium which contains water and which will conduct electricity. The source of energy may be a generator, a rectifier, a few tons of magnesium, or a small rod of zinc.

The accompanying diagrams represent cathodic protection systems; in each of them the protected structure, or cathode, is indicated by "C," and the anode by "A:" the dotted lines show the current flow through the electrolyte, and the solid lines that in the metallic part of the circuit. In each case the cathodic protection is due to the continuous maintenance of a negative charge on the surface of the cathode which is in contact with the electrolyte.

## Planning Corrosion Studies

*(Continued from page 189)*

proposed recommendations are discussed with the district engineers. Consultation is held with the mechanical-engineering group as to the feasibilities from the equipment viewpoint. Here the mechanical engineer will weigh the economics of the proposed equipment required over the cost of existing facilities.

**Report of investigations.**—The results of the above conferences are shown in a report of investigations. This may take the form of a single letter to a single district, or a formal, bound report for wide distribution within the company's management, district superintendents, department heads, the research and development department, or for publication in trade journals.

**Evaluation of results.**—Active responsibility for the project is shifted from the chemical-engineering group at this point to the mechanical-engineering group. The latter is faced with the job of lowering operating costs which have been increased unduly by severe corrosive conditions. The success or failure of an investigation lies not in the proving of the expectations of the chemical engineer, but in the reduction in operating costs of an oil property.

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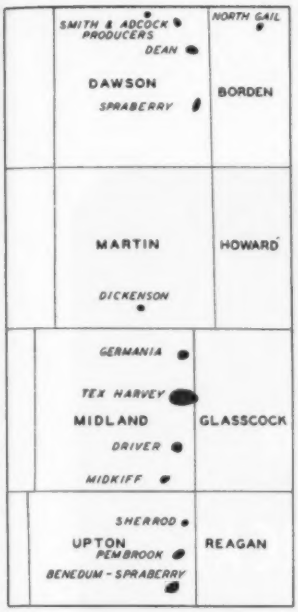



***Map shows location of Spraberry production along north-south trend in heart of Midland basin.***

## *Drilling and Production Practices in*

# West Texas' Spraberry Fields

**by Roy F. Carlson**
West Texas District Editor

**Generally, drilling anywhere along the Spraberry trend is very much alike. Electric logs of wells drilled are very similar from grass roots to total depth. Completion practices likewise follow a pattern.**

ONE of the most recent additions to the list of oil-productive horizons in West Texas is the Spraberry sand which is found over a considerable area along the eastern edge of Midland basin. Wells into this pay have by now produced upwards of a million barrels of oil in less than the 2 years since the first well was completed in the horizon. Expansion of present producing areas is taking place very rapidly, particularly in Tex Harvey field of east-central Midland County.

Wildcat and development activity in the Spraberry play is being carried on from the western side of Benedum field in Upton County to the north side of Dawson County—a distance of a little over 100 miles. Along the southern portion of this trend, production has been found at about 10-mile intervals from Benedum through Germania field in northeast Midland County, a distance of about 50 miles in which six producing areas exist. In Midland County, the Spraberry has shown oil in several of the deep wildcats in the western portion of the county.

The trend extends into Dawson County, near the north edge of which two wildcats recently showed production. Also in the northern part of the play is North Gail field, a one-well field in northwest Borden County.

### Spraberry Field

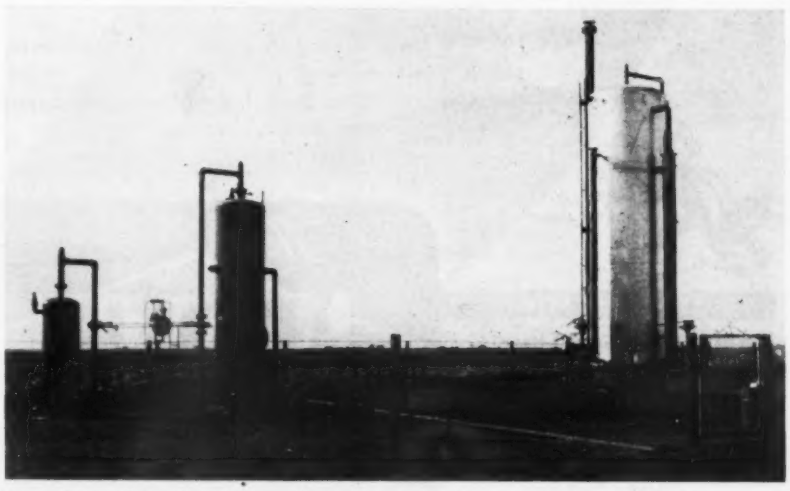
Spraberry field in Dawson County was probably responsible for calling attention of operators to the Spraberry sand as a possible pay, and was also responsible for its name. The area, consisting of about thirty 40-acre locations, has been productive for several years from the San Andres at about 3,750 ft. Late in 1948 a deep test was drilled in the field. Staining and saturation were noted at about 7,000 ft. and it was decided to test the section.

Because the zone that showed oil was a very tight, hard sandstone it was shot before testing, and on the test showed flowing oil. It was this shooting that established the Spraberry as a pay and that prescribed some method of aiding natural permeability into all completion programs into the Spraberry zone. The well, Seaboard Oil Co. of Delaware 2-D S. E. Lee, was completed in January 1949.

In Spraberry field the pay is arched into a gently closed anticline with its longer axis trending north-south. The pay horizon is about 300 ft. thick and comprised of what appear to be alternating layers of permeable and nonpermeable sand. About six of these permeable layers are found in the 300-ft. section. Some water is found on the field edges in varying positions laterally in the various zones. A second thick Spraberry sand section is found below the upper 300-ft. portion, the two being separated by a thick shale section. This lower section is not productive in Spraberry field. Average elevation of the area is about 2,900 ft.

**Drilling program.**—In general the drilling program is commonplace. About 1,300 ft. of 10¾-in. surface casing is set in a 15-in. hole. The intermediate string consists of about 3,200 ft. of 7⅝-in. casing in a 9⅞-in. hole. The oil string is 5½-in. casing in 6¾-in. hole, and is usually set on top of the pay at an average depth of 6,500 ft. The wells are normally drilled in with 4¾-in. hole and completed in open hole.

Clear water is used for drilling the wells until just above top of the pay. Overlying the pay is a shale section which will start to fall in around the drill pipe if left exposed to water too



***Separation and treating equipment on the A. J. Spraberry lease from which the pay zone and the field derived their name. Separators are connected to a flow meter for continuous gas production measurement.***

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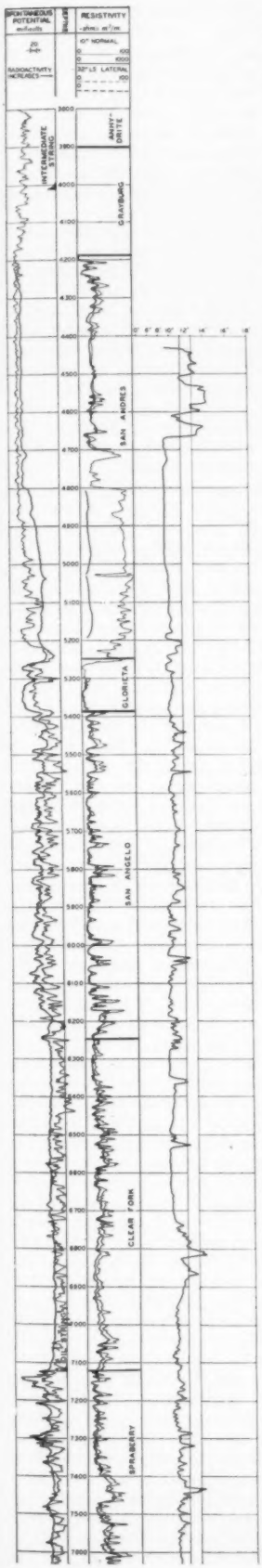



long, so it is necessary to mud up to prevent too great a water loss into the shale. After reaching the top of the pay, the wells are drilled in with oil-emulsion mud which is in turn circulated out with oil when total depth is reached.

**Completion practices.** — In edge wells varying water levels introduce some completion practices novel to West Texas. In these wells the oil string is set through part of the pay with joints of special-alloy drillable pipe set opposite part of the pay horizon and with steel pipe set opposite nonpaying and sometimes water-bearing horizons. After the pipe is cemented into position, the drillable portion of the pipe is underreamed out of the string leaving sections of open hole above and below a string of cemented steel pipe. The section of aluminum-alloy pipe can be removed with a caustic soda-sodium nitrate solution, but Seaboard, sole operator in Spraberry field, chooses to underream.

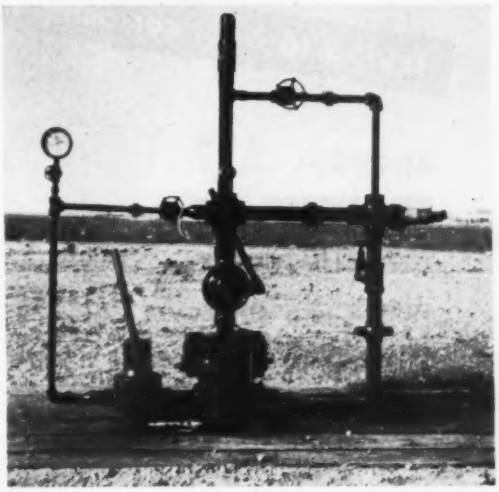
**Shooting.**—As mentioned, the permeability must be augmented artificially, and the practice of Seaboard is to shoot the open-hole sections of the pay with solidified nitroglycerin. In this shooting particular care is taken to limit the shot to just the pay zones, to avoid fracturing the nonpay or water-bearing formations. A concentration of about 2½ qt. per foot is generally used.

**Reservoir characteristics.**—The reservoir permeability varies from an amount too small to measure to a maximum of about 15 md. Porosity is on the order of 15 per cent. Original bottom-hole pressure in the first Spraberry well at a datum of —3,550 ft. was 2,422 psi. Reservoir temperature at discovery was 104° F. Initial production from the discovery well was rated at 319 bbl. per day through ¼-in. choke. The reservoir was undersaturated, the saturation pressure of the oil being 2,273 psi.

The gas-oil ratio at discovery was 746 cu. ft. per barrel. At the present time the field gas-oil ratio is on the order of 850 to 1. There is no evidence of gas segregation in the reservoir, since gas-oil ratios have not changed materially since discovery. Although there is water present, the extremely low permeability makes an effective

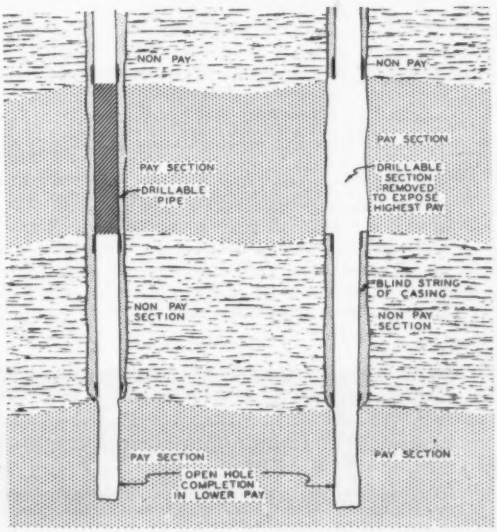
*Left: Electric and caliper logs of wells in the Tex Harvey area. The two are not from the same well but are close enough together to show similarity. The surface elevation of the calipered well is 16 ft. higher than the well in which the electric log was run. Mud data for the electric log include a density of 8.7, a viscosity of 40, a resistivity of 1.64 at 80° and .84 at 140°, a pH of 11, and a water loss of 5 cc. Hole size for the caliper survey was 8¾ in. Note on this log: To obtain volume in cubic feet multiply the number of square inches of area between zero and curve by 14.45.*

*Seaboard Oil Co. P. W. Jeter A 1-D, one of six wells pumping from the Spraberry zone.*



*Well head of a flowing Spraberry zone well, located in Spraberry field.*

*Below: "Window" completions in Spraberry field. Section is removed with caustic soda solution or by underreaming. Cement sheath is fractured off by the heat of the chemical reaction or by the under reamer blades.*



natural water drive appear unlikely.

Differential vaporization of a sample of the reservoir fluid gave a gas-oil ratio of 746 to 1 at standard conditions. During this process, the oil shrank to 0.78 of its reservoir volume measured at 60°. The gravity of the residual oil was 40.6° A.P.I. Viscosity of the reservoir fluid at reservoir temperature was 1.98 cp. Specific gravity of the flashed gas was 1.003.

**Activity.**—Three rigs are running in the field, two drilling and one on cleanout. The cleanout rig is necessary because of the 100 per cent shooting program. There are 30 wells in the field, 6 of which are on pump. Spacing is on 40-acre units.

At the end of November 1950, accumulated production reached a total of 528,316 bbl. of oil, 304,242 M.c.f. of gas, and 7,600 bbl. of water. Water is presently being produced at a rate of about 2,000 bbl. per month from six wells. The present allowable production is 111 bbl. per well per day, subject to shutdown days. Oil is sold to Texas-New Mexico Pipe Line Co., and the gas is used locally.

### Tex Harvey Field

By far the largest of the Spraberry fields is Tex Harvey. This field at the present time has about 50 units, some drilling the wells, others cleaning out after shooting. At the first of the year the number of wells completed was rapidly approaching 50, and with the large number of rigs running this total was being added to at a rate of about 1 a day.

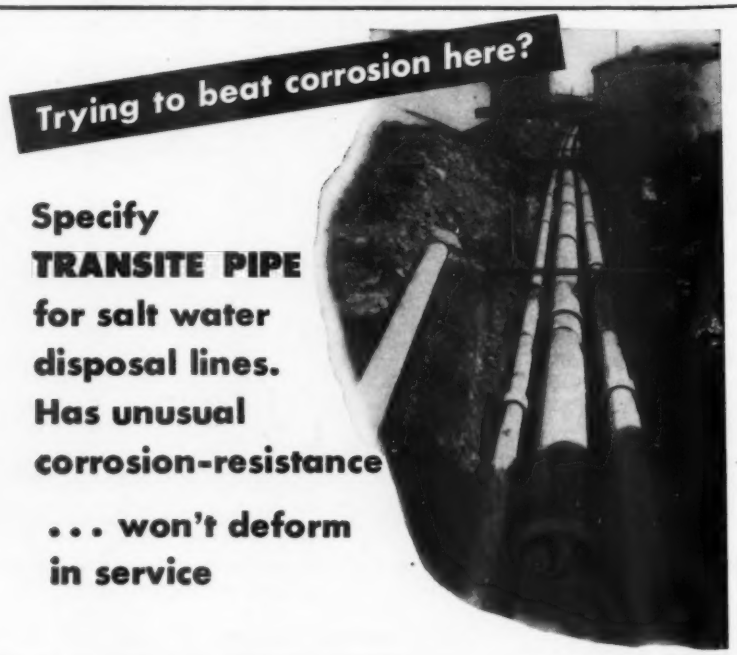
Techniques in drilling in the field have advanced to where one of the wells can be drilled and completed in about 40 days, compared to 65 days less than 8 months ago. Cost of the wells has been correspondingly cut from nearly $100,000 to about $70,000 for drilling and completing with tankage on the lease.

Initially all wells in the field were being shot with from 2½ to 4 qt. of explosive per foot of pay section. Recently, however, operators have begun to Hydrafrac the wells, with what up to now have been beneficial results and without incurring the several days of cleanout time on the hole that is required after shooting. This practice was just adopted on a large scale about the end of 1950 so the durability of the production increase cannot yet be ascertained.

**Casing program.**—Casing practices call for at least 120 ft. of surface casing which is on the order of 13⅜-in. in diameter. The intermediate string is set a few feet into the Grayburg lime (see log) at about 3,900 ft. The liner technique is used for the third string of pipe which is set on top of the pay at about 7,000 ft. One of the casing practices in use calls for setting 7-in. pipe in an 8¾-in hole to this point and cementing it up into the intermediate string about 100 ft. The liner string, then, is about 3,200 or 3,300 ft. in length. Some difficulty is experienced in obtaining a thorough cement job on this string because of lost circulation.

**Drilling.**—Drilling is carried on with clear water until the pay section is reached. Drilling in is normally done with oil and with reverse circulation. Some lost-circulation trouble is encountered in the San Andres section below the Grayburg lime. Some wells have penetrated this porous section without losing circulation, having been drilled with just a surface string and an oil string. However, most other wells have lost mud into the San Andres, probably because while drilling the red-bed anhydrite section above the Grayburg the mud weights up with salt and becomes too heavy for the San Andres. Also, there appear to be stringers of friable material in the anhydrite section that will fall in and cause an occasional twistoff or stuck pipe, so that operators feel it is better to case off the salt section before trying to drill the San Andres.

**Completion.**—Originally in Tex Harvey field, completion was tried in both of two zones of production about 300 ft. apart. Practices now are generally to complete in just the top 100 ft. or so of the upper zone, leaving the rest of the pay sections for a later date. A recent development has one operator planning to drill the lower zone, and complete there, but using a section of drillable pipe opposite the upper pay, for a possible later completion.

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Transite Pipe for salt water disposal lines is made in a full range of sizes. For further information write Johns-Manville, Box 290, New York 16, N. Y.

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**Johns-Manville**
**TRANSITE PRESSURE PIPE**

**Reservoir data.**—Bottom-hole pressures in Tex Harvey originally were calculated to be on the order of 2,400 psi. Original reservoir temperature was around 155° F. Gas-oil ratios in wells vary widely, the average being 600 to 800 cu. ft. per barrel. Although there are variations, the produced oil is generally light in color, and of 37° to 38° gravity. Initial potentials vary considerably, probably depending to a large extent on the method of completion. From 200 to 500 bbl. per day are normal outside figures.

Here, as in Spraberry field, natural permeability is low—less than 1 md. in unfractured formation. Porosity is also about 15 per cent. The producing horizon here was at one time called the Floyd sand after a landowner in the area. However, after the name was accepted by nomenclature organizations, the pay was shown to be the same as that in Spraberry field and Spraberry is now the accepted name

### Germania Field

A third area in which rigs are beginning to concentrate is Germania field, 10 miles north of Tex Harvey. Here again, drilling conditions are very much the same with about 30 days' drilling time required to the oil-string casing point, and an additional 15 to 18 days to drill in, shoot, and clean out. Just a few wells have been drilled so far but at least five rigs are now running in the field.

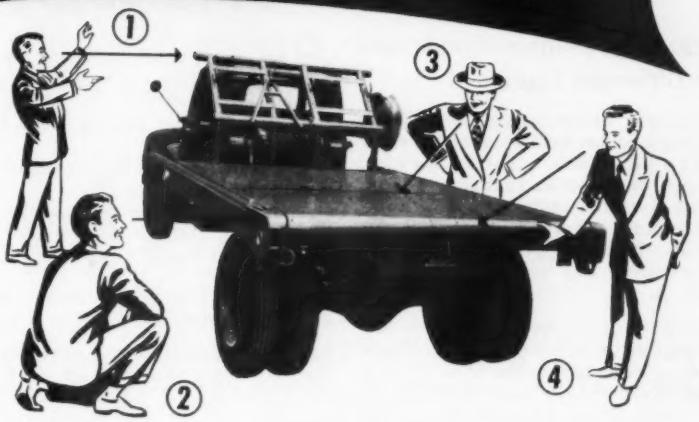
The top of the pay is found at about 7,100 ft. from an average elevation of 2,670 ft. Bottom-hole pressures are a little bit over 2,300 psi. at about 7,300 ft. Wells drilled so far potential at about 200 bbl. per day through small chokes and produce oil of a gravity of plus or minus 39°. Gas-oil ratios are on the order of 1,000 to 1. The reservoir probably is producing from fractures, as in nearly all of the Spraberry wells, and has a very low permeability and a porosity of about 12 per cent.

For the most part, drilling anywhere along the Spraberry trend from the Benedum area through the Pembrook area in Upton County, the Midkiff and Driver areas in southeastern Midland County, Tex Harvey field, Germania field in northeastern Midland County, and Spraberry field in Dawson County is very much alike.

Electric logs of the wells that have been drilled are much alike all the way from grass roots to total depth. Completion programs are also very similar, although sizes of casing vary widely because of the limited amounts of pipe available due to shortages.

The pay zone itself is also similar all through the trend, being hard and tight, with production apparently coming from fractures in the pay. These fractures are apparently continuous over long distances, because there is evidence of communication between wells, and the average porosity of less than a millidarcy would not permit such communication in any short length of time.


CONSTRUCTION



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# QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

## "Standing" Evaporation Losses For Different Liquids—I

**It is our understanding that there are publications available which show average losses (percentagewise) through evaporation that may be expected from the bulk storage of volatile liquids (primary interest is for benzol). Will you please forward at our expense, any such documents?—J. W. R.**

Tabulations of average losses are not known to this department. There are good reasons for the lack of such tables. Evaporation losses from fixed-roof tanks are a function of at least the following usually undefined variables:

1. Frequency of fillings.
2. Size of tank or vessel.
3. Fullness of tank (liquid surface exposed).
4. Seasonal variations in temperature.
5. Daily variations in temperature.
6. Exposure to sun.
7. Nature of surface with respect to its emissivity, or radiation properties.
8. Relief valve setting—and tightness of roof.
9. Disturbance of the vapor during filling.

Thus, each storage tank exhibits its own evaporation loss characteristics and these characteristics vary from day to day.

If all of the effects listed above could be ascertained or if averages of them were available, it would be a relatively simple matter to evaluate the effect of kind of liquid on the rate of evaporation. A general basis can be established from data on losses from gasoline storage tanks.

Standing losses are reported by C. C. Ashley in "Evaporation Losses of Petroleum Oils From Steel Storage Tanks," *(The Oil and Gas Journal, November 18, 1938, page 70)*, for a 9.5-lb. gasoline stored at 75° F., to be about 0.375 per cent per month (4.5 per cent per year). One of the curves of Atwell, Brown, and Chenicek in their "Prevention of Evaporation Losses from Gasoline Storage" (Refiner and Nat. Gaso. Mfr., October 1925, page 34) shows a loss of 0.34 per cent per month (4.08 per cent per year). An illustration published by Chicago Bridge & Iron Co. shows a loss of 3 per cent per year and a filling loss of 0.2 per cent per filling. Finally, H. J. D'Aragon published the material of Table 1 in his "Protective Storage at Pipe-Line Terminals" (Pet. Engineer, March 1944).

**TABLE 1—STANDING EVAPORATION LOSSES FOR MOTOR GASOLINE**

| Tank capacity (bbl.) | Loss, per cent per year |
|---|---|
| 1,500 | 5.5 |
| 5,000 | 4.5 |
| 15,000 | 3.5 |
| 37,500 | 3.25 |
| 55,000 | 3.0 |
| 80,000 | 2.6 |

Standing losses occur mainly because air is sucked in when the tank is cooled and is ejected as the tank warms. The air is in the tank long enough to somewhat pervade the entire gaseous mixture and it becomes saturated with vapor from the liquid. The higher the vapor pressure of the liquid or the higher the temperature, the greater the proportion of vapor in the gas mixture. As an example, at a total pressure of 14.5 psia. and for a liquid whose vapor pressure is 1.0, the amount of vapor ejected with one volume of air will be 1 ÷ (14.5 — 1) or 0.074 volumes. Similarly for a 10-lb. vapor pressure liquid, 10 ÷ (14.5 — 10) or 2.22 volumes vapor per volume of air will be ejected.

**TABLE 2—APPROXIMATE STANDING LOSSES RELATIVE TO (OR AS A FRACTION OF) THE LOSS OF 10-LB. R.V.P. GASOLINE STORED AT 60° F.**
(Per cent per year)

| Temp. (°F.) | Relative standing losses, per cent per year | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 3 R.v.p. | 5 | 7 | 8 | 9 | 10 | 11 | 12 R.v.p. |
| 20 | .... | .13 | .21 | .24 | .29 | .33 | .37 | .42 |
| 40 | .12 | .23 | .34 | .42 | .49 | .57 | .65 | .73 |
| 60 | .20 | .37 | .58 | .71 | .86 | 1.0 | 1.17 | 1.37 |
| 80 | .33 | .62 | 1.02 | 1.26 | 1.58 | 1.97 | 2.46 | 3.02 |
| 90 | .43 | .80 | 1.37 | 1.76 | 2.32 | 2.93 | 3.96 | 5.21 |
| 100 | .54 | 1.06 | 1.91 | 2.52 | 3.50 | 5.04 | 7.45 | *12.6 |
| 110 | .70 | 1.36 | 2.98 | 3.96 | 6.28 | *11.8 | *38.0 | .... |
| 120 | .91 | 1.91 | 4.68 | 8.0 | *18.0 | .... | .... | .... |

*Probably too large because the liquid would cool itself by self-refrigeration.

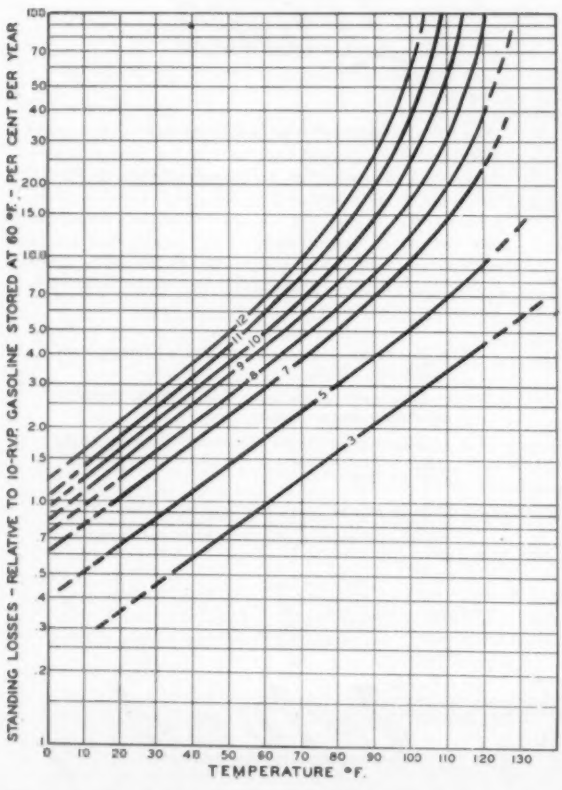


*Fig. 1—Approximate standing losses from storage tanks based on a loss of 5 per cent per year from a fixed-roof tank holding 10-lb. R.v.p. motor gasoline. Primarily for small tanks (5,000 bbl.)*

Table 2 shows losses relative to the standing loss of 10-lb. R.v.p. gasoline stored at 60° F. If losses for a specific tank are known for one material, they may be converted by means of Table 2 to losses for another material at any temperature by means of ratios. Fig. 1 is based on an assumed standing loss of 5 per cent for 10-lb. R.v.p. gasoline stored at 60° F. It can be looked upon as only an approximation that illustrates the general relationship. Smaller losses occur in large tanks (10,000-80,000 bbl.).

For benzene which has a vapor pressure of 3.4 psia. at 100° F., Fig. 1 indicates standing losses of about 0.6 to 3.0 per cent in the temperature range of 40° to 104° F. Note that Reid vapor pressure is about 10 per cent lower than the true vapor pressure and hence 3-lb. line of Fig. 1 was used.

In next week's issue similar material will be presented for filling losses.

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# How Grease Lubricates*—2

SINCE it is not possible to watch a grease as it works in a moving bearing, theoretical considerations must be resorted to in order to explain how a plastic material like grease can provide fluid lubrication. Apparently, whenever a grease is subjected to "working"—that is, when some force such as the churning, shearing action in an ordinary bearing begins to act on the plastic body of the grease—queer things happen to the soap-lattice structure.

When the journal begins to rotate, the grease offers resistance to flow because it is held together by soap fibers throughout its mass. But this resistance is overcome by the force applied which "breaks" the soap-lattice structure. This breaking, however, takes place along "lines of shear" which can be visualized as producing layers of more or less uniform thickness which slide over each other.

Experiments have shown that, as a grease is worked, the plastic resistance to motion decreases very rapidly as speed of motion is increased. The apparent viscosity of the material drops to values very near that of the petroleum oil used in its manufacture. As it is "working" in a bearing the grease develops an apparent fluidity but exhibits this fluidity only in the direction of the motion. For want of a better term we shall designate this characteristic of greases as "directional fluidity."

That this apparently fluid grease does not flow out of the bearing may be accounted for by the fact that the three-dimensional soap lattice is broken only at the surfaces of the layers. Within the layers, the fibrous soap structures remain intact, each layer moving in the direction of motion with its internal fibers held together like logs in a raft.

To visualize the "directional fluidity" of a grease in its behavior or action as a lubricant, reference is made again to our conception of the fibrous structure in greases. Certain scientific evidence allows one to assume that the forces holding the fibers in the lattice structure are relatively small compared with the mechanical force that tends to disrupt this structure when the grease is worked. The term shearing force is commonly applied to these disrupting influences. If a grease is visualized under a shearing force, it will be apparent that this force is acting in only one direction—a direction parallel to its motion.

*From material prepared by Shell Oil Co. on "Fundamentals of Lubricating Greases."

*Fig. 1—Disregarding the oil for the moment, it can be assumed that the soap molecules at the surfaces of the bearing are standing on end and firmly "rooted" much like the grass on a lawn. Between these areas, however, the soap molecules are assembled together in fibers which form a random pattern like grass that a mower has cut.*

*Fig. 2—Illustrating "lines of shear" along which the soap-lattice structure is broken. Layers are created that slide over each other.*

In using the term shearing force in connection with grease action, think of a person holding a deck of cards between the palms of his two hands. If he presses his palms firmly together—and at the same time moves one hand outward—he will cause the individual cards to slide along over each other in the direction of the motion applied. The pressure of the hands on the deck is analogous to the load or weight of the journal on the bearing.

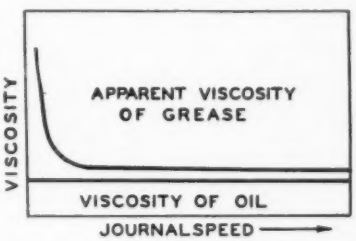


*Fig. 3—"Apparent viscosity" of grease is indicated by upper curve and viscosity of oil by lower straight line. As soon as the speed of the rotating journal has caused the grease to be sheared into a number of layers, these layers seem to slide over each other with a minimum of friction. The resistance to motion of the sheared layers closely approaches the resistance to flow, or viscosity, of the oil in the grease.*

*Fig. 4—When a grease-lubricated bearing stops, the greater portion of the lubricant may be "squeezed" away from the point of greatest load. But the surfaces at this point still retain tightly adhering films of grease, held in place by polar molecular attraction, which prevent metal-to-metal contact.*

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# Pipe Lines

## 175-Mile-Line Contract Let

DALLAS.—Contract for the 175-mile, 24-in. line to be built by Tennessee Gas Transmission Co. and Northeastern Gas Transmission Co. in New York and Massachusetts has been awarded to Oklahoma Contracting Co. This project will extend from a point on the Hudson River, a short distance south of Albany, N. Y., to a point near Wilmington, Mass.

Right-of-way and ditching operations will start April 1; pipe laying will commence May 1. Paul R. Halbert will be in charge of the contractor's headquarters at Springfield, Mass., which will be established to supervise the entire job. Harry Prindle will be his assistant.

Oklahoma Contracting will put three spreads on the project to be supervised and located as follows: (1) H. A. (Red) Wylie, field office at Pittsfield, Mass.; (2) Aldress Kilgore, field office at Westfield, Mass.; (3) L. B. Rea, location of field office not yet determined.

The company will begin work in South Texas May 1, on 65 miles of 26 and 30-in. loops for Tennessee Gas Transmission Co. Panama Shiflett, spread superintendent, will have headquarters at Falfurrias, Tex.

## Panhandle Lets Contract

KANSAS CITY, Mo. — Panhandle Eastern Pipe Line Co. has announced the letting of contracts for 130 miles of 30-in. natural-gas loops on its main line, and for 44 miles of 26-in. loop line to R. A. Conyes Construction Co.

Construction work is scheduled to begin May 1 on three 30-in. lines in the Illinois-Indiana area—the Tuscola, Ill., loop, 22 miles; Montezuma, Ind., loop, 45 miles; and Zionsville, Ind., loop, 63 miles.

The 44-mile, 26-in. loop will be constructed near Edgerton, Mich. The lines are expected to be placed in operation sometime in July.

Contracts for more lines not yet cleared by the Federal Power Commission are expected to be announced by Panhandle in the near future.

## Purchasing Department Moved

INDEPENDENCE, Kans.—The purchasing department for Sinclair Pipe Line Co. has been moved here from Tulsa, and is functioning in new quarters in the Sinclair Building, Roy J. Tibbets, president, has announced.

All purchasing of equipment, materials, and supplies for Sinclair Pipe Line will be made in the future through the Independence office.

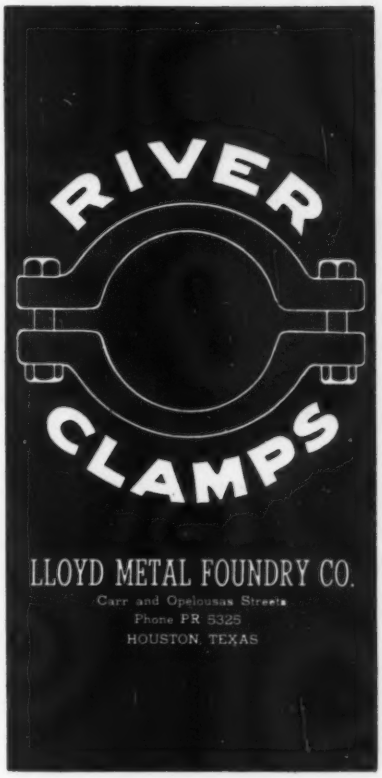
Glen O. Ash, transferred from Tulsa, heads the department as purchasing agent. Ash has been with the company since 1919. Also moved to the new headquarters was P. O. Landrith, assistant purchasing agent, and Volney Hilford, buyer.

## Line Now Moving Products

DENVER.—Shamrock Oil & Gas Corp. announced recently that products are now moving through the 310-mile Panhandle - to - Denver line owned jointly by Shamrock and Phillips Petroleum Co. The line connects refining facilities in the Texas Panhandle, including Shamrock's McKee refinery 12 miles northeast of Dumas, Tex., and the Phillips refinery at Phillips, Tex., with terminal facilities in La Junta and Denver, one of which is the new Denver terminal completed by the company in December.

Products transported through the line include propane, butane, several grades of gasoline, diesel fuel, dis-

*WHITE RIVER CROSSING.—Dragline prepares for the laying of 30-in. pipe at the White River crossing near Newport, Ark., of the Texas Illinois Natural Gas Co. line now under construction from the Gulf Coast to Joliet, Ill.*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tillate, and kerosine. Products are boosted on their way to Colorado by pump stations at McKee refinery, Boise City, Okla., and La Junta. Additional stations will be installed if it becomes necessary in the future to increase the daily volume of products delivered through the line.

## Capacity Increase Planned

BATON ROUGE.—Plantation Pipe Line Co. has announced plans to increase capacity of its Baton Rouge-Greensboro, N. C., products line from 100,000 to 167,000 bbl. per day.

The company has awarded a $600,000 contract to Westinghouse Electric Corp. for electrical equipment to be installed in a new 18-in. line from Baton Rouge to Bremen, Ga., and a 14-in. line to Charlotte, N. C. Equipment will include switch gear, motor starters, control centers, and ventilating fans.

Plantation Pipe Line Co. is owned jointly by Standard Oil Co. (Ind.), Standard Oil Co. of Kentucky, and Shell Oil Co.

## Grand Valley Line Approved

DENVER.—A $2,308,000 natural-gas pipe line proposed by Grand Valley Pipeline Co. has been approved by the Colorado Public Utilities Commission.

The line will be constructed from Piceance Creek field in northwestern Colorado to Grand Junction. In addition to piping gas to Grand Junction, the line would serve Rifle, site of the U. S. Bureau of Mines' oil-shale plant; Newcastle, where a new paper plant is scheduled to be constructed; and other communities in western Colorado.

Grand Valley is owned equally by Public Service Co. of Colorado, General Petroleum Corp., and United States Gas Co.

## Radio System Installed

HUGOTON, Kans.—Cities Service Gas Co. has completed another phase in its current modernization program with the installation in this area of a radio-communications system.

Transmitting station and antenna tower are located at the Hugoton compressor station, and are designed to serve the entire area. The central transmitting unit operates on a 159-megacycle band, and has a power of 250 watts. High frequency of the band will eliminate static and furnish clear communications to 13 mobile receiving and transmitting units.

Installation of the central station has been completed, and more than half of the mobile units have been attached to company automotive equipment. Preliminary tests are being made, and it is expected that the station will be ready to operate soon.

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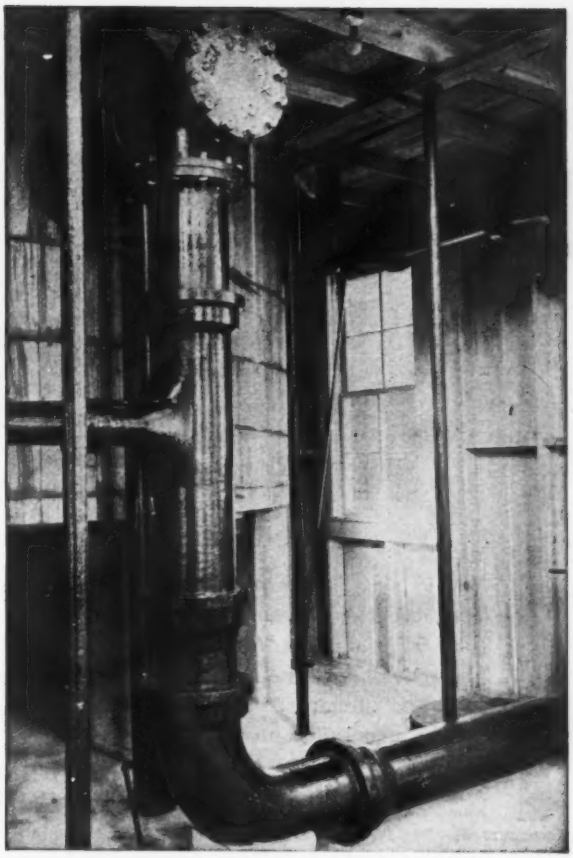

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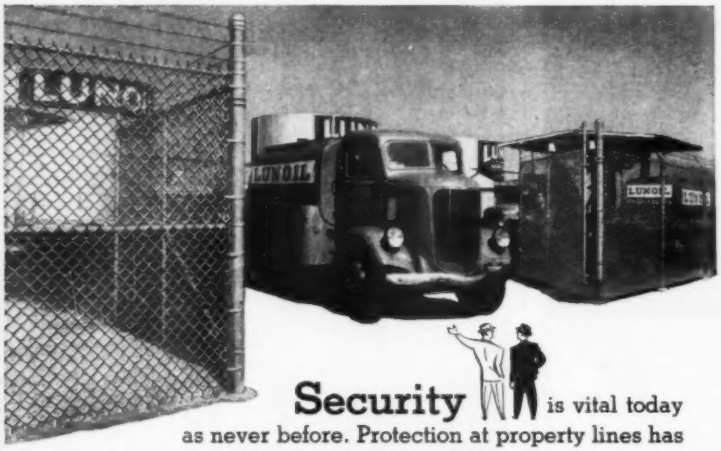


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# Pipe-Line Construction

FOLLOWING is a tabulation of pipeline projects which are planned or under construction. Included are crude-oil, products, and natural-gas lines. The list was compiled from surveys made by The Oil and Gas Journal.

### Crude-Oil Pipe Lines

**Gulf Refining Co., Tulsa, Pipe Line Division.**—72 miles, 6-in., under way, El Dorado, Kans., to Webb City, Okla.; Pipeline Service Co., contractor. J. W. Welcher Atlanta, Kans., spreadman.

**Pan American Pipe Line Co.**—80 miles, 10-in., under way, from southern part of Scurry County, Texas, to a connection with Humble pipe line near San Angelo, Tex.; Brown & Root, contractor.

**Phillips Pipe Line Co.**—53 miles, 6-8 in.; under way; Wheeler, Tex., to Sweeny, Tex.; O. R. Burden Construction Corp., contractor.

**Phillips Pipe Line Co.**—35 miles, 10-in.; authorized; Brownfield, Tex., to Plains, Tex.

**Phillips Petroleum Co.**—285 miles, 10-in., under way, Phillips, Tex., to Yale, Okla.; Brown-Lite Co., Tulsa, and Arey-Phillips Construction Co., Pampa, Tex., contractors.

**Platte Pipe Line Co.**—1,080 miles, 20-in., underway, Chatham Station, Wyo., to Wood River refining area in Illinois; R. H. Fulton, contractor, Chatham Station, Wyo., to Holdredge, Neb.; Bishop & Lock, contractor, Holdredge, Neb., to Nebraska-Kansas line; Ramsey Brothers, contractor, Nebraska-Kansas line to Missouri River; O. R. Burden, contractor, Missouri River to Mississippi River.

**Portland Pipe Line Co. (Montreal Pipe Line Co., Ltd.).**—85 miles, 18-in., under way, Portland, Me., to Gorham, N. H.; Oklahoma Contracting Co., contractor of Section 1; H. A. Waylie, Westbrook, Me., superintendent.

**Portland Pipe Line Co. (Montreal Pipe (Canada).**—321 miles, 18-in., contracted, Gorham, N. H., to international boundary near N. Troy, Vt.; Associated Pipeline Contractors, Inc., contractor of Section 2, Lacy Walker, Barton, Vt., spreadman.

**Portland Pipe Line Co. (Montreal Pipe Line Co.).**—68 miles, 18-in., contracted. Canadian boundary to Montreal; Fred Mannix, contractor of Section 3.

**Sinclair Pipe Line Co.**—700 miles, 22-in., planned; Drumright, Okla., to Chicago.

**Texas Pipe Line Co.**—56 miles, 12¾-in., Chico to Wichita Falls, Tex.; R. H. Fulton & Co., contractor; M. L. Boyd, spreadman, Henrietta, Tex.

### Products Pipe Lines

**Great Lakes Pipe Line Co.**—355 miles, 12-in., authorized, Kansas City through Omaha and Sioux City Iowa, to Sioux Falls, S. D.

**Great Lakes Pipe Line Co.**—119 miles, 8-in.; planned; Des Moines to Iowa City.

**Plantation Pipe Line Co.**—432 miles, 14-13-in., Baton Rouge to Bremen, Ga.—to Charlotte, N. C., Williams Brothers, Co., contractor. Completion scheduled by end of 1951.

**Salt Lake Pipe Line Co.**—140 miles, 8-in., contracted Boise, to Baker, Idaho; Bechtel Corp., contractor.

**Susquehanna Pipe Line Co.**—126 miles, 8⅝-in., under way, Toledo, Ohio, to Sarnia, Ont., Canada; H. L. Gentry Construction Co., contractor. James Mitchell, Toledo, Ohio, spreadman.

**Standard Oil Co. (Ind.).**—50 miles, 8-in., under way, north of Sugar Creek, Mo., refinery; Lawhon Construction Co., Southern Mill & Mfg. Co., contractors.

**Standard Oil Co. (Ind.).**—144 miles, 8-in., authorized, Neodesha, Kans., to Sugar Creek, Mo.

**Texas Pipe Line Co.**—56 miles, 10 in., under way, Lawrenceville, Ill., to Mt. Vernon, Ind.; O. R. Burden Construction Corp., contractor; O. P. Hines, spreadman; Mt. Carmel, Ill., field office.

### Natural-Gas Pipe Lines

**Atlantic Gulf Gas Co. (United Gas Pipe Line Co.).**—1,530 miles, planned, Alabama-Florida-Georgia-South Carolina.

**Cities Service Gas Co.**—40 miles, 4-10 in., Kansas, field office, Liberal; Pat Gilmore, spreadman; Knup Construction Co., Inc., contractor.

**Commonwealth Natural Gas Corp.**—84 miles, 12-in., contracted, Richmond to Newport News, Va.; Ray L. Smith, contractor.

**Commonwealth Natural Gas Corp.**—104 miles, 18-in., under way, Stanardsville to near Petersburg, Va.; Ray L. Smith & Son, contractor, Don C. Smith, Orange, Va., spreadman.

**Commonwealth Natural Gas Corp.**—537 miles, 20-in., proposed, West Bend, Ky., to Norfolk, Va.

**Consolidated Gas Utilities Corp.**—41 miles, 12-in., planned, Enid to Blackwell, Okla., Marlow to Cement, Okla.

**East Tennessee Gas Corp.**—150 miles, 16-in., under way, Knoxville to Bristol, Tenn.

**East Tennessee Natural Gas Co.**—398 miles, 3-16-in., planned, Nashville to Chattanooga to Knoxville, Tenn., and laterals.

**East Tennessee Natural Gas Co.**—106 miles, 12-16-in., contracted, Lobelville to Tullahoma, Tenn.; Oman Construction Co., contractor.

**East Tennessee Natural Gas Co.**—130 miles, 12-in., under way, Athens, via Chattanooga, to Tullahoma, Tenn.; N. A. Saigh Co., Inc.

**East Tennessee Natural Gas Co.**—120 miles, 12-in., planned, Chattanooga to Knoxville, Tenn.; Walters & Saigh Construction Co.

**East Tennessee Natural Gas Co.**—185 miles, 16-in., planned, Lobelville to Chattanooga, Tenn., Walters & Saigh Construction Co.

**Eastern Natural Gas Corp.**—292 miles, 24-in., proposed, Phoenixville, Pa., via New Haven and Hartford, Conn., Providence, R. I., Springfield, Mass., and Boston.

**Egyptian Natural Gas Co.**—80 miles, 6-8-in., authorized, Norris City to Salem-Centralia, Ill., area.

**El Paso Natural Gas Co.**—450 miles, 24-in., under way, San Juan basin, New Mexico, to Franconia, Ariz.

**Home Gas Co.**—70 miles, planned, Orange, Sullivan, Rockland, and Cattaraugus counties, New York.

**Magnolia Petroleum Co.**—60 miles, 4-24-in., gathering system in LaWard and Lolita fields, Texas; Henry L. Lemons & Co., contractor. W. A. Remington, spreadman.

**Michigan Gas Storage Co.**—150 miles, 20-in., planned, Chelsa terminal-Winterfield and Cranberry Lake, Mich.; Mahoney Contracting Co., contractor.

**Michigan-Wisconsin Pipe Line Co.**—197 miles, 6-18-in., under way, Milwaukee to Green Bay and Two Rivers, Wis.; G. G. Griffis Construction Co., contractor. F. K. Egan, Fond du Lac, Wis.

**MidSouth Gas Co.**—40 miles, 12-in., Helena to Forrest City, Ark.; Tulsa Construction Co., contractor; Frank McCoy, spreadman; field office, Marianna, Ark.

**Mississippi River Fuel Corp.**—40 miles, 18-in., authorized, Dubach to Perryville, La.

**New York State Natural.**—164 miles, 16-in., planned, Ithaca to Albany, N. Y.

**New York State Natural Gas Corp.**—70 miles, 20-in., planned, North Oakford, Pa., to Ohio state line.

**Northern Natural Gas Co.**—597 miles, 20-26-in., contracted, ten loops from Texas to northern Iowa.

**Northern Natural Gas Co.**—76 miles, 4 to 12-in., under way, gathering line in vicinity of Hugoton, Kans., Cheek Construction Co.,


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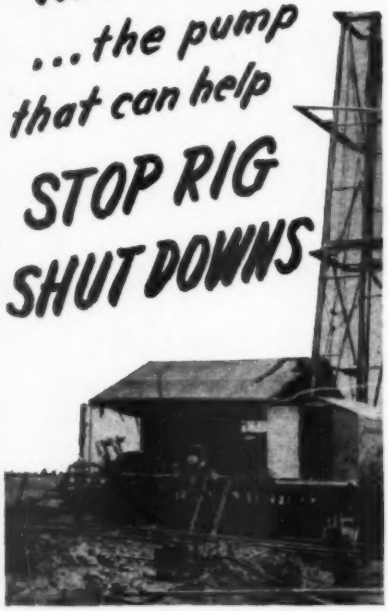

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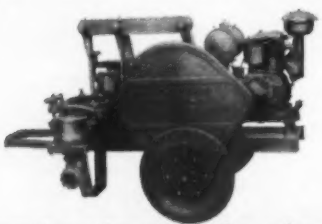

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*Engineers and Representatives Everywhere*


contractor, Troy Cheek, Ulysses, Kans., superintendent.

**Northern Natural Gas Co.**—111 miles, 34-in., under way, Ogden, Iowa, to St. Paul, Minn.; R. B. Potashnick, contractor.

**Northern Natural Gas Co.**—75 miles, 26-in., under way, north of Beaver, Okla.; R. H. Fulton & Co., contractor of Loop 2. Merele Lewellen, Mead, Kans., spreadman.

**Northern Natural Gas Co.** — 72½ miles, 26-in., under way, Bushton to Minneapolis, Kans.; R. H. Fulton & Co., contractor of Loop 4. M. L. Boyd, Salina, Kans., spreadman.

**Northern Natural Gas Co.**—155 miles, 20-in., contracted, Garden City to Bushton, Kans.; R. H. Fulton & Co., contractor of Loop 5. Jerry Nash, Garden City, Kans., spreadman.

**Northern Natural Gas Co.**—222 miles, 26-in., under way, Borger, Tex., to Nebraska line; R. H. Fulton & Co., contractor. M. C. Boyd, Ashland, Kans., spreadman.

**Northwest Natural Gas Co.**—750 miles, planned, Washington, Oregon, and Idaho.

**Oklahoma Natural Gas Co.**—53 miles, 26-in., under way, Edmond to Depew, Okla.; Trojan Construction Co., contractor; "Swede" Tillotson, spreadman; Stroud, Okla., field office.

**Oklahoma Natural Gas Co.**—40 miles, 16-in., planned, Ninnekah, Okla., to County Line, Okla.; Trojan Construction Co., contractor.

**Pacific Gas & Electric Co.**—47 miles, 8-in., authorized, Salina to Kilig City, Calif.

**Pacific Northwest Pipe Line Co.** — 400 miles, 22-in., gathering lines on Texas Gulf Coast to Pacific Northwest pipe line.

**Pacific Northwest Pipe Line Corp.**—2,175 miles, 26-in., authorized, Texas Gulf Coast to Pacific Northwest.

**Panhandle Eastern Pipe Line Co.** — 356 miles, 26-in., authorized, looping in Texas, Oklahoma, Kansas, Missouri, Illinois, Indiana, Ohio, and Michigan.

**Phillips Petroleum Co.**—99 miles, 3-16-in., under way, Sherman and Hansford counties, Texas gas-gathering system; Vaughn & Taylor Construction Co., Inc., Dumas, Tex.

**Piedmont Natural Gas Co.** — 1,350 miles, 20-in., planned, Greenville, Miss., to Carolinas.

**Plains Natural Gas Co.**—120 miles, 4-24-in., contracted, Oklahoma-Kansas area, Hugoton field, gathering system; Midwestern Constructors, Inc., (Arey-Phillips Construction Co.) contractor. T. S. Nunley, Liberal, Kans., chief inspector.

**San Diego Gas & Electric Co.**—53 miles, 16-in., planned, San Diego County, California.

**San Diego Gas & Electric Corp. (Southern Counties Gas Co.)** — 85 miles, authorized, San Diego, Riverside, and Moreno, California.

**South Central Alabama Natural Gas Co., Inc.**—150 miles, proposed, central Alabama.

**South Georgia Natural Gas Co.**—248 miles, planned.

**South Jersey Gas Co.**—75 miles, 10-12-14-in., under way, Pleasantville, N. J., to Bustleton, Pa.; G. G. Griffis, Inc., contractor, Ray Abney, Millville, N. J. spreadman.

**Southeastern Michigan Gas Co.**—55 miles, 12¾-in.; under way; from point near Clawson, Mich., to Port Huron, Mich.; H. L. Gentry Construction Co., contractor; field office, Utica, Mich.; spreadman, Frank Morris.

**Southwestern Michigan Gas Co.**—55 miles, 12¾-in., proposed, Oakland County to Marysville, Mich.

**Southern Counties Gas Co. of California.**—81 miles, 20-in., authorized, looping.

**Southern Natural Gas Co.**—120 miles, 16-in.; under way; Mitchell Village, Ala., to Bolingbroke, Ga.; Associated Pipe Line Contractors, Inc., contractor; Columbus, Ga., field office; Lacy Walker, spreadman.

**Southern Natural Gas Co.**—18 miles, 18-in., under way, Gwinville, Miss., to Selma, Ala.; Sheehan Pipe Line Construction Co., contractor. Jim Brown, Meridian, Miss., spreadman.

**Southern Natural Gas Co.**—161 miles, 16-18-in., under way, Selma, Ala., to Elmore, Ala. Associated Pipeline Contractors, Inc.,


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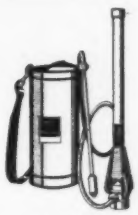

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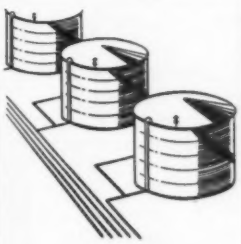

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**Southern Natural Gas Co.**—138 miles, 20-22-in., planned, Chattanooga, Tenn., to Lexington, Miss.

**Southern Natural Gas Co.**—375 miles, 24-in., planned, Gwinville, Miss., to Atlanta, Ga.

**Southern Union Gas Co.**—78 miles, 8-10-14-in., planned, New Mexico loops and laterals.

**Sunray Oil Corp.**—133 miles, 8-30-in., system for Snyder gasoline plant, Vaughn & Taylor Construction Co., contractor. D. D. Vaughn, spreadman.

**Tennessee Gas Transmission Co.**—102 miles, 16-in., under way, Bayou Sale to Kinder, La.; Latex Construction Co., contractor. H. L. Leake, superintendent.

**Tennessee Gas Transmission Co.**—700 miles, 20-26-in., planned. Burnaugh, Ky., to Massachusetts including 400-mile line to Buffalo.

**Tennessee Gas Transmission Co.**—95 miles, 20-in., under way, Natchitoches to Kinder, La.; Latex Construction Co., contractor. F. A. Silar, superintendent.

**Tennessee Gas Transmission Co.**—992 miles, 30-in., planned, first 150 miles of loops to be laid at Monroe, La., Greenville, Miss., Midland and Portland, Tenn.

**Tennessee Gas Transmission Co.**—70 miles, 26-30-in. contracted, between Stations 104 and 110; Anderson Brothers Corp., contractor. E. C. McCoy and Arkie Hobson, Richmond, Ky., spreadmen.

**Tennessee Gas Transmission Co.**—174 miles, 30-in., under way, western Tennessee and Kentucky; Price-Morrison, contractor. Jack Hodges and R. L. McMillon, superintendents.

**Tennessee Gas Transmission Co.**—75 miles, 30-in., under way, from near Glasgow northeastward to near Lebannon, Ky.; Morrison Construction Co., contractor. R. L. McMillon, Adamsville, Tenn., spreadman.


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**Tennessee Gas Transmission Co.**—99 miles, 30-in., under way, near Dickson, southwestward to near Selmer, Tenn.; H. C. Price, contractor. Jack Hodges, Linden, Tenn., spreadman.

**Tennessee Gas Transmission Co.**—170 miles, 26-30-in., contracted, Kentucky; Anderson Brothers Corp., contractor.

**Texas Eastern Transmission Corp.**—1,400 miles, 26-in., planned, Texas to Pittsburgh, loops.

**Texas Gas Transmission Corp.**—723 miles, 26-in., under way, Lisbon, La., to Middletown, Ohio.

**Texas-Illinois Natural Gas Pipeline Co.**—1,300 miles 30-in., under way, Corpus Christi area to Joliet, Ill.

**Texas-Illinois Natural Gas Pipeline Co.**—100 miles, 26-in., La Gloria to Refugio, Tex.; Midwestern Constructors, Inc., contractor of Schedule 1; M. T. Wilhite, superintendent; field office, Refugio.

**Texas-Illinois Natural Gas Pipeline Co.**—100 miles, 30-in., under way, Mississippi River to Effingham, Ill.; Midwestern Constructors, Inc., contractor of Schedule 11. M. T. Wilhite, superintendent; field office, Du Quoin, Ill.

**Texas-Illinois Natural Gas Pipeline Co.**—100 miles, 30 in., Effingham to Sibley, Ill.; Midwestern Constructors, Inc., contractor of Schedule 12.

**Texas-Illinois Natural Gas Pipeline Co.**—92 miles, 30-in., Sibley to Joliet, Ill.; Midwestern Constructors, Inc., contractor of Schedule 13.

**Texas-Illinois Gas Pipe Line Corp.**—409 miles, 30-in., contracted, Arkansas and Missouri; Bechtel Corp. A. M. Berlander, general superintendent; field offices at Newport, Ark., J. E. Richardson; Texarkana, Ark., V. L. Williams; Popular Bluff, Mo., A. M. Berlander.

**Texas-Illinois Gas Pipe Line Corp.**—126 miles, 30-in., contracted; H. C. Price, contractor. Work under way.

**Trunkline Gas Co.**—278 miles, 20-in., contracted, Valley of Texas; R. H. Fulton & Co., contractor.

**Trunkline Gas Co.**—1,775 miles, 10-26-in., planned, includes 740-mile, 26-in., Lake Charles, La., to Tuscola Station of Panhandle Eastern Pipe Line Co., and 1,035 miles, 10-24-in., Lake Charles, La., to McAllen, Tex., completion due October 1, 1952.

**Trunkline Gas Co.**—176 miles, 26-in., under way, Darnell, La., to Longville, La.; Houston Contracting Co., contractor of Section A, main line. E. C. Norris, Olla, La., spreadman. W. H. Hayes, spreadman, De Ridder, La.

**Trunkline Gas Co.**—180 miles, 26-in., contracted, Darnell, La., to Senatobia, Miss.; Anderson Bros. Corp., contractor, Section B, main line.

**Trunkline Gas Co.**—184 miles, 26-in., under way, Senatobia, Miss., to Paducah, Ky.; R. H. Fulton & Co., contractor of Section C. main line. Clark Williams, Memphis, Tenn., spreadman.

**Trunkline Gas Co.**—186 miles, 26-in., contracted, Joppa to Tuscola, Ill.; Mahoney Contracting Co., contractor of Section D, main line.

**Trunkline Gas Co.**—262 miles, 20-in., contracted, McAllen to Altair, Tex.; R. H. Fulton & Co., contractor of Section E and F, lateral lines.

**Trunkline Gas Co.**—217 miles, 24-in., contracted, Longville, La., to Altair, Tex.; Anderson Bros. Corp., contractor of Sections G and H, lateral line.

**Trunkline Gas Co.**—71 miles, 20-16-10-in., contracted, Longville, La., south; Houston Contracting Co., contractor of Section 1, lateral line.

**United Gas Pipe Line Co.**—51 miles, 12¾-in., proposed, Soso and Sherron fields, to near Meridian, Miss.

**United Gas Pipe Line Co.**—23 miles, 16-in., proposed, Mud Lake field, La., to near Port Arthur, Tex.

**United Gas Pipe Line Co.**—93 miles, 6 to 16-in., proposed, fields in Plaquemines Parish to near New Orleans.

**United Gas Pipe Line Co.**—26 miles, 20-in., planned, Louisiana, connecting with East Texas system.

**United Gas Pipe Line Co.**—90 miles, 16-in., planned, West Bay field to New Orleans.

**Utah Natural Gas Co.**—325 miles, 22-in., proposed, "Four Corners" in southeastern Utah.

**Valley Gas Pipe Line Co., Inc.**—600 miles, 24-in., proposed, Berclair, Goliad County, to northeast Saratoga, Hardin County, Texas, to Vermilion Bay area of Louisiana.

**Valley Gas Pipe Line Co., Inc.**—1,000 miles, 30-in., proposed, Saratoga northeast to Arcadia, La., to El Dorado and Jonesboro, Ark., Cape Girardeau, Mo., Lawrenceville, Ill., Terre Haute, Ind., and Atlanta, Ind., thence to northeast terminal point in southern Michigan.

**Virginia Natural Gas Co.**—153 miles, Buckingham to Richmond and Portsmouth, Va.

**Westcoast Transmission Co., Ltd.**—1,408 miles, 30-in., planned, northern Alberta to Vancouver, B. C., and northern California.

**Western Pipe Lines.**—1,200 miles, 22-in., planned, Southern Alberta to Duluth, Minn.

### Foreign Crude-Oil Pipe Lines—Planned and Under Way

**Cia. de Petroleo Ganso Azul, Ltd.**—48 miles, 4-in., planned, Ganso Azul field to Pucalpa on upper Ucayali River, Peru.

**Condor S.P.A. (Shell).**—80 miles, planned, Genoa to Rho, near Milan, Italy.

**Direccion General de Yacimientos Petroliferos Fiscales.**—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

**Iraq Petroleum Co., Ltd.**—656 miles, 30-32-in., under way, Kirkuk, Iraq, to Banias, Syria, 1952; Bechtel-Kirkuk, contractor.

**Middle East Pipelines, Ltd.**—800 miles, 34-36-in., planned, Iran to a Levantine port.

**Petroleos Mexicanos.**—160 miles, 10-in., under way, Minatitlan to Salina Cruz, Mexico.

**Petroleos Mexicanos.**—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

**Shell Caribbean Petroleum Co.**—11 miles 16-in., authorized; Bachaquero (north) to Lagunillas, Venezuela, 5-51.

**Shell Caribbean Petroleum Co.**—165 miles 30-in., authorized; Palmarejo to terminals on the Paraguana Peninsula (Cardon and Las Piedras, Venezuela), 12-51.

### Foreign Products Pipe Lines—Planned and Under Way

**Colombia Ministry of Petroleum.**—90 miles, 6-in., planned, Puerto Berrio to La Dorada, Colombia.

**Colombia Ministry of Petroleum.**—103 miles, 4-in., planned, Puerto Berrio to Medellin, Colombia.

**Colombian Ministry of Petroleum.**—75 miles, 4-in., planned, Buena Ventura to Cali, Colombia.

**Estrada de Ferro Santos Jundiai.**—32 miles, 10-in., under way, Santos to Sao Paulo, Brazil; Techint, contractor.

**Estrada de Ferro Santos a Jundiai.**—32 miles, 18-in., under way, Santos to Sao Paulo, Brazil (fuel oil line); Techint, contractor.

**Northern Pipe Line, Ltd.**—300 miles, 10-in., planned, Montreal, Que., to Toronto, Ont., Canada.

**Petroleos Mexicanos.**—160 miles, 10-in., under way, Minatitlan to Salina Cruz, Mexico.

**State of Cundinamarca, Colombia.**—120 miles, planned, Puerto Salgar, to Bogota, Colombia.

### Foreign Natural-Gas Pipe Lines—Planned and Under Way

**Azienda Generale Italiana Petroli.**—Under way, Lodi to Milan, Italy.

**Azienda Generale Italiana Petroli.**—Under way, Lodi to Turin, Italy.

**Azienda Generale Italiana Petroli.**—Under way, Lodi to Genoa, Italy.

**Direccion General del Gas del Estado.**—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

**Direccion General del Gas del Estado.**—62 miles, under way, Comodoro Rivadavia to Caleta Olivia, Argentina.

**Northwest Natural Gas Co.**—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

**Petroleos Mexicanos.**—205 miles, 16-in., considered, Monterrey to Torreon, Mexico.


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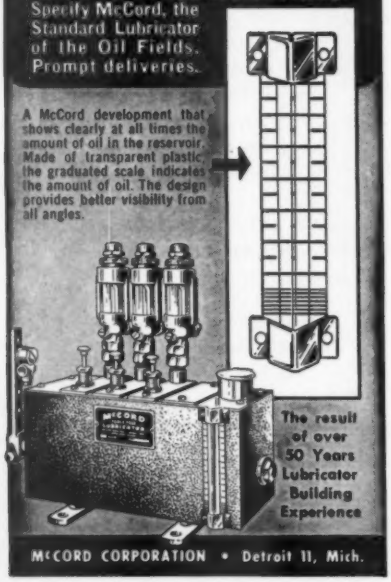

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# REFINING

## W.P.R.A. Program Readied

LAKE CHARLES, La.—Refiners gathered here for the February 22-23 meeting of the Western Petroleum Refiners Association will concentrate much of their attention upon effects of emergency federal controls on refinery wages and manpower.

The program, for which final arrangements have now been made, will be devoted largely to industrial-relations problems during the first day, February 22. Technical discussions and presentation of papers will take up February 23.

Talks scheduled to be presented during the 2-day session include:

"Techniques and Methods for the Selection of Supervisors," R. F. Wyly, superintendent in charge of industrial relations, central division, Stanolind Oil & Gas Co., Oklahoma City; "Some Practical Aspects of Supervisors and Employe Training," C. L. Stinnett, assistant personnel director, Lion Oil Co., El Dorado, Ark.

"Defense Organization in Washington," Donald C. O'Hara, attorney for the association in Washington. "Where Do We Go From Here?" L. J. Whetsell, assistant to the manager, producing department, The Texas Co., Houston. "The War in the Far East," Lt. Comdr. Frank A. Manson, United States Navy, Washington.

"Aviation Fuels," Davis Read, Universal Oil Products Co., Chicago; "Factors Controlling the Aging of Cracking Catalysts," Dr. G. A. Mills, Houdry Process Corp., Philadelphia.

The meeting is the first to be held in Lake Charles, which was selected because of its central location convenient to refiners in the Gulf Coast, Louisiana, and Texas areas.

W.P.R.A. plans to hold other regional meetings this year in Wichita, Tulsa, Lansing, Mich., and Casper, Wyo. The W.P.R.A. annual meeting will be held in San Antonio, April 2-4. More than 1,000 refiners are expected to attend.

## Cracker Nears Completion

EL DORADO, Ark.—All major vessels are now in place on Pan-Am Southern Corp.'s new fluid catalytic cracking unit under construction here, it has been announced.

Work on the cracker was begun last April, and is expected to be completed by the end of March or the first of April. All that now remains is to finish installation of piping and valving arrangements.

The unit will add approximately 3,000 bbl. per day to the refinery's high-octane-gasoline production. It will also produce 3,000 bbl. per day of furnace-oil distillate, and process a stock of 7,000 bbl. per day of gas oil to produce gasoline and furnace-oil distillate.

A large part of the feed stock to be used by the cracker will come from the refinery's coking unit which was dedicated last September. The alkylation plant is now being rehabilitated, and will produce aviation gasoline when it is placed in operation again this month.

The entire unit occupies a space 125 by 185 ft. Some of the piping is 6 ft. in diameter and will handle more than 7,600 tons per hour of catalyst circulating through the reactor and regenerator system. This would be the equivalent of 5,000 railroad carloads of catalyst circulating through the unit each day.

## Research Method Studied

WASHINGTON. — Committee D-2 (petroleum products and lubricants) of American Society for Testing Materials now is considering the possibility of recommending a change from the motor method to the research method for rating antiknock quality of motor fuel.

Any action taken as a result of conclusions formed during the study of testing methods for rating motor gasoline and aviation gasoline, and quality classification of heavy-duty lubricating oils will be guided by a consensus of producers and consumers.

Accordingly, the group would appreciate comments from the industry relative to the proposed change. Such comments should be directed to W. T. Gunn, secretary of the committee, Room 2040, 50 West 50th Street, New York City.

## Synthetic Rubber Needed

AKRON.—John L. Collyer, president of B. F. Goodrich Co., has urged the Government to authorize immediately the construction of plants to add 200,000 tons per year to American synthetic-rubber production.

This action is needed to deal promptly with pressures that are needlessly costing the American people tens of millions of dollars a year, he said.

Current demand for crude rubber, he explained, far exceeds the available supply, as proven by the fact that crude rubber is selling at 70 cents per pound, compared to 20 cents at the beginning of 1950.

An increase of 200,000 tons in capacity for production of synthetic rubber would relax the necessity for large-scale purchases of additional crude rubber for stockpiling at inflated prices, he declared.

The only apparent reason for increasing further the Government stockpile of crude rubber is to be assured of adequate supplies at some time in the future. However, Collyer said, the stockpile is already ade-

quate to supply the military and essential civilian needs of the United States alone for a 5-year war.

## Sunray Cat Back on Stream

DUNCAN, Okla.—After successful completion of a 29-day turnaround, Sunray Oil Corp.'s big catalytic cracking unit at Sunray Village, south of here has been placed back on stream, according to F. L. Martin, vice president of refining.

The 25,000-bbl. per day cracker was shut down January 13 after breaking the world's continuous-operating record for a U.O.P. fluid catalytic cracking unit, with a mark of 677 consecutive operating days. Although workmen were hampered by extremely cold weather, the complete major overhaul was completed in 25 days. The remainder of the time was used for starting up.

Additional cooling surface was added to the unit during the turnaround which will enable the daily gas-oil throughput to be increased 3,000 to 4,000 bbl. if needed.

High tribute was paid by R. L. Johnson, refinery manager, to the more than 300 craftsmen whose combined efforts placed the cracker back on stream.

## German Catalytic Report

PITTSBURGH. — The Bureau of Mines has made available a report which presents methods for determination of the effectiveness of catalytic reactors in controlling operating temperatures, drawings of converters, and illustrative graphs.

The report describes common reactor types, including plate, inner and outer catalyst, and annular-volume converters, and discusses the theoretical aspects of each type of reactor with its comparative effectiveness. The original paper was prepared by Gustav Wirth, chemist at I. G. Farbenindustrie, A.G.'s Leuna Works, in Germany, and translated by R. C. Grass, bureau research engineer, and H. J. Kandiner, bureau chemical engineer.

Free copies of the report, Information Circular 7587, may be obtained by writing to the Publications Distribution Section of the Bureau of Mines, 4800 Forbes Street, Pittsburgh, 13.

## Gulf No-Rust Compound Out

PITTSBURGH.—Development of a thin, film-type, antirust compound that will provide approximate surface coverage of 390 sq. ft. per gallon has been announced by Gulf Oil Corp.

The new compound, named Gulf No-Rust No. 6, is recommended for protection of metal surfaces exposed to corrosion either indoors or outdoors during domestic and overseas shipment and for either indoor or outdoor storage over long periods of time of equipment susceptible to corrosion.

The film of compound after application does not exceed 8/1,000 in. in thickness, and is applied by dipping at a temperature of 70° F. The film dries sufficiently within 4 hours to permit handling without harm to the coating.

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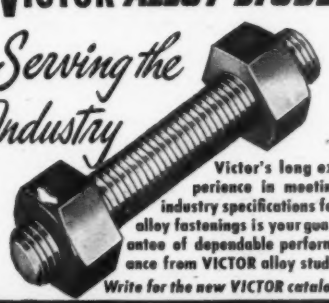

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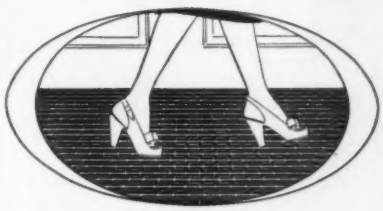

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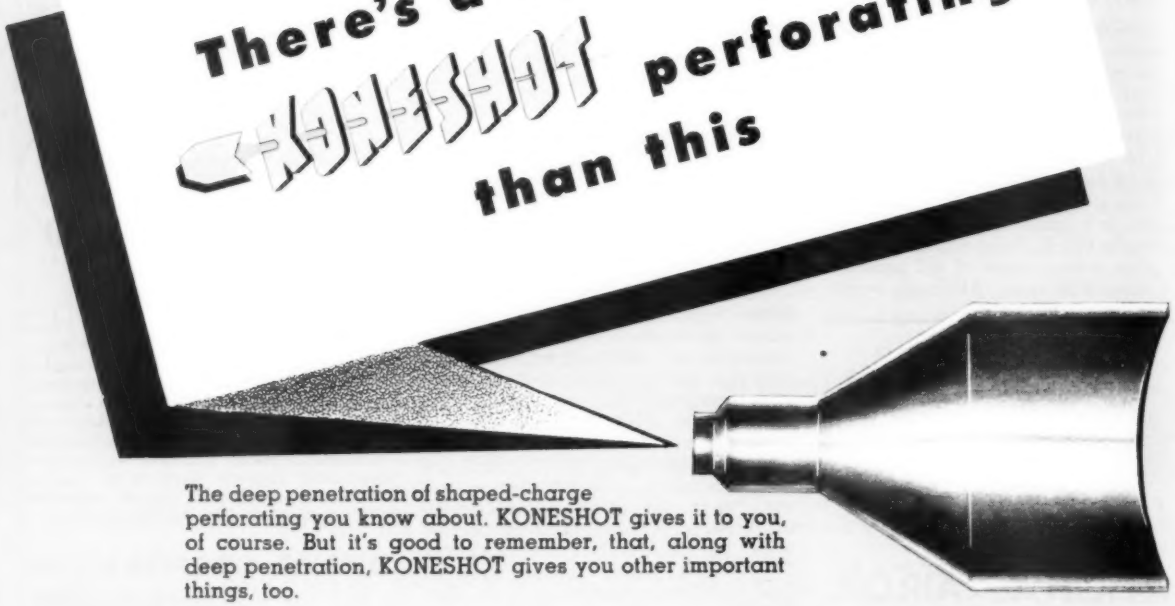

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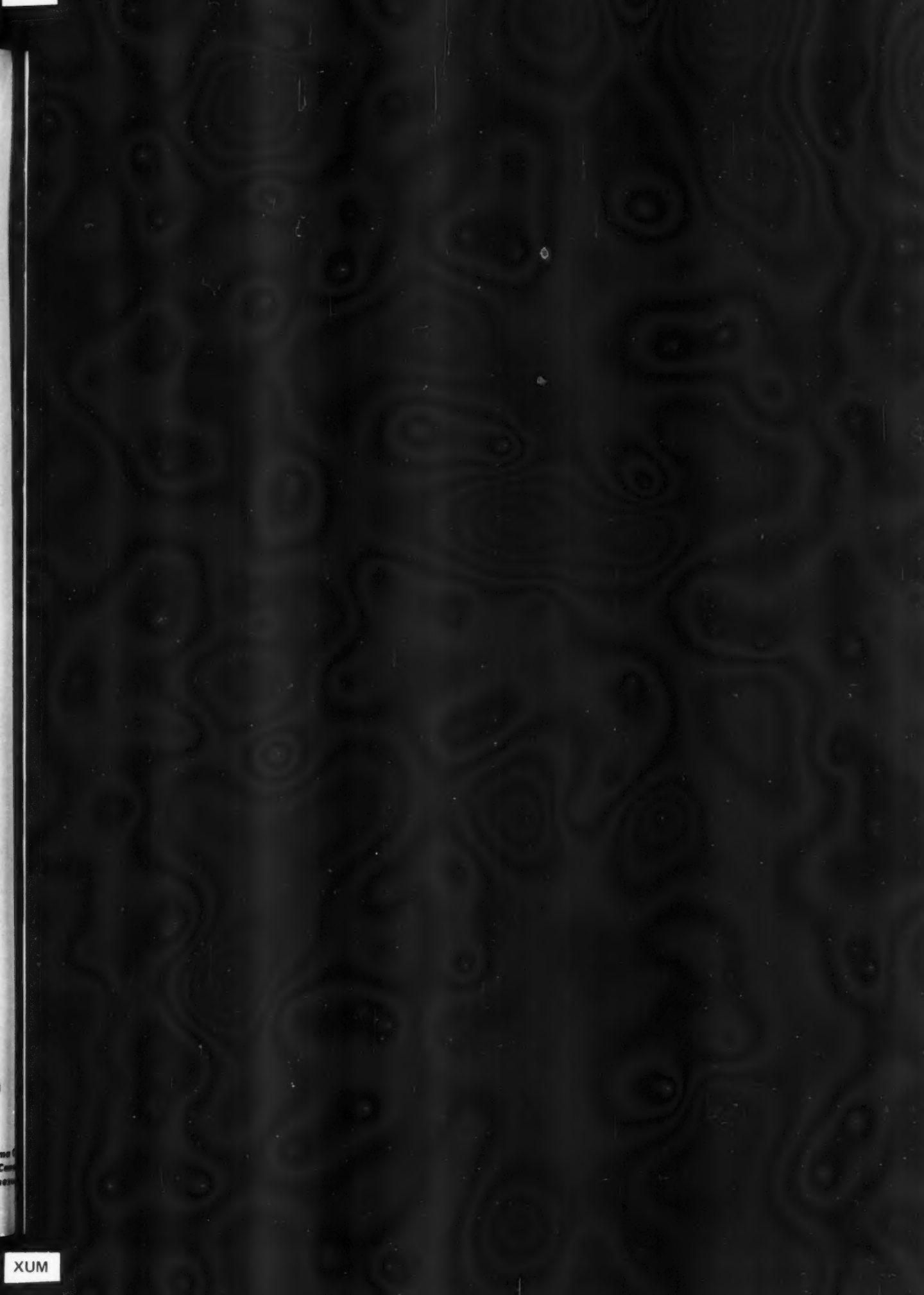

# Among the Drilling Contractors

## Blanton to Be Head of Houston Drilling Firm

Controlling interest in the Starworth Drilling Co., Houston, has been acquired by W. N. Blanton, who for 21 years has been executive vice president and general manager of the Houston Chamber of Commerce. Blanton will assume presidency of the company March 1, when his resignation from the chamber position becomes effective. Associated with him in the drilling company are E. C. Scurlock, George Starr, and Jack Blanton.

## California Contractor Gets 10-Well Project

C. M. Morse, drilling contractor with headquarters at Long Beach, Calif., has a contract with Cleveland Oil Co. to drill 10 shallow wells on the latter's David lease in the Kern River field of San Joaquin Valley, California.

The wells, the first of which is under way, will be drilled to the Kern River sand at approximately 1,100 ft. The operator already has five producers on the lease making about 100 bbl. of 13°-gravity crude daily. Location of the lease is in 36-28s-27e.

**Longhorn Drilling Corp.,** San Antonio and Three Rivers, Tex., has contracted for a projected 8,000-ft. wildcat test to be drilled for Tide Water Associated Oil Co. in the North Karon field, Live Oak County, South Texas. The new operation is 1 Hicks Williams. Location is in the F. Hines Survey.

**Standard-Fryer Drilling Co.,** Dallas, has the contract for a 9,500-ft. reef zone test which Max Pray is starting in western Lynn County, West Texas. The test is on the Nevels lease in Section 4, Block C-42, PSL Survey.

**McCutcheon Drilling Co.** is the contractor on a projected 6,000-ft. wildcat test to be drilled for R. J. Caraway in the SW NW NE 32-5s-6e, in northern Marshall County, southern Oklahoma. The location is about 4 miles south of Tishomingo, Johnston County. Location is for 1 Sparlin.

**H. Waggoner Drilling Co.,** which drilled the discovery well of the recently opened Southeast Norfolk pool, Payne County, Oklahoma, has contracted for three additional wells, two offsetting the discovery well, and one at a southwest extension location. The wells will be drilled for Gulf Coast Western Co. on "farm-out" deals with H. Waggoner & Co., operator of the discovery well. The latter well produces from Red Fork sand at a total depth of 3,115 ft. Location is in the SW SW NE 7-18n-6e.

**Roeser & Pendleton, Inc.,** Fort Worth, has contracts on the first two of a five-well drilling program by James H. Snowden et al., exploring northeast Dawson County, Texas. Locations have been made for 1-43 Carrie S. Dean, Section 43, Block 1, J. Poitevent Survey, 6 miles north of the Spraberry deep field; and for 1-35 Dean, in Section 35, Block 2,

*On the derrick floor of a rig which Hissom Drilling Co., Seagraves, Tex., is operating in the Midland Farms field, West Texas. Left to right: L. V. Shelton, Cy Anderson (driller), B. H. Martin, Randall Shelton, crew members, and L. G. Beard, toolpusher.*

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TTRR Survey, 8 miles northwest of the Spraberry field. Both tests were scheduled to 10,000 ft. with rotary.

**T. V. Criswell Drilling Co.,** Monahans, Tex., will drill 1 Mrs. H. Bade, Section 22, Block 22, H&TC Survey, Sterling County, Texas, for Parochial Petroleum Co. of Austin and Midland. Location for the 5,000-ft. test is on a Standard Oil Co. of Texas farmout, 10 miles west of Sterling City and 5 miles east of the Herrell field, which has shallow production.

**Bud Tone,** Monahans, Tex., has cable tool contract on Parochial Petroleum Co. 1 O. O. Meyer Estate, a 1,500-ft. test in Section 4-T, T&P Survey, 3 miles west of the Durham field, in Sterling County, Texas.

**Mathew Drilling Co.,** Hobbs, N. M., has moved in cable tools to clean out at San Juan Oil Co. 1 W. L. Johnson, an abandoned well in Gaines County, West Texas. The original hole was drilled by Sinclair Oil & Gas Co. to 8,692 ft. After cleaning out, the hole is to be redrilled to about 4,700 ft. to test the San Andres.

**Rock Hill Drilling Co.,** San Antonio, has a rig working for Rock Hill Oil Co., an affiliated company, and Rodney DeLange and W. Earl Rowe, in Youngeen field, Bee County, South Texas. Current operation is 36 Nona Berry, Bee County School Land Survey. Projected depth is 3,800 ft.

**Big Chief Drilling Co.,** Oklahoma City, is contractor on a 11,000-ft. wildcat test which B. E. Davis and D. J. Madden of New Orleans are starting in Walthall County, Mississippi. Location for the test, 1 Ball, is in 22-1n-11e, about 5½ miles southeast of Tylertown.

**Woolf & McGee,** Tyler, Tex., is moving a light rig to a wildcat location in Abraham Booker Survey, Panola County, East Texas, where it will drill a 3,000-ft. test for O. B. Siler of Logansport, La. Location is about 6½ miles northwest of the latter town.

**ROTARY RIGS IN OPERATION***
(United States and Western Canada)

| Area— | Week ended 2-12-51 | Change week ended 2-5-51 | Change week ended 2-13-50 |
|---|---|---|---|
| Gulf Coast | 493 | +26 | + 13 |
| W. Tex.-N. M. | 746 | +38 | + 63 |
| Ark.-N. La.-E. Tex. | 128 | + 2 | — 25 |
| Oklahoma | 253 | — 5 | + 16 |
| Kansas-Nebraska | 146 | — 7 | + 45 |
| Illinois-Eastern | 106 | +23 | + 73 |
| Rocky Mountains | 101 | 0 | + 37 |
| Pacific Coast | 132 | +10 | — 8 |
| Total U. S. | 2,105 | +87 | +214 |
| Western Canada | 113 | +12 | + 40 |
| Total | 2,218 | +99 | +254 |

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States as a whole and the Rocky Mountain and Western Canada areas are shown by charts on pages 244 and 245.

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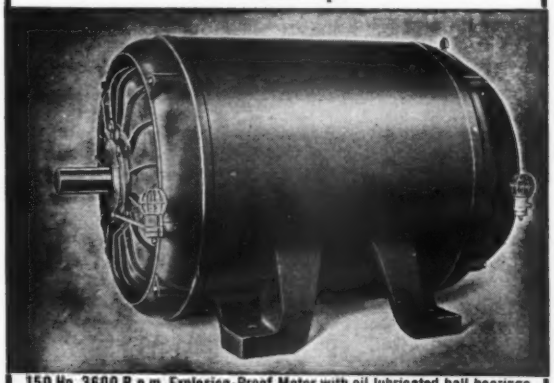

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# Champion "Q-X"
## Undersurface Lubricant
*Does a Good Job for*

**NATIONAL FUND-RAISING SERVICES, Inc.**

LOS ANGELES FORT WORTH DALLAS ATLANTA WASHINGTON

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ALLOTT W. YADON, PRESIDENT
IVAN H. WOOD, EXECUTIVE VICE PRESIDENT
FORT WORTH, TEXAS
POST OFFICE BOX 1189
TELEPHONE FA-6287

February 15, 1951

Mr. John T. Heaton, President
Champion Products, Inc.
Stephenville, Texas

Dear Mr Heaton:

Mobility is a paramount requirement for staff members of National Fund-Raising Services, Inc., and since the members of this organization pride themselves in driving good automobiles so they may meet specific appointments at any time, day or night, throughout a wide-flung area, efficient automobile operation is of primary interest to us.

Upon the recommendation of other users, we have made use of CHAMPION Q-X UNDERSURFACE LUBRICANT and find that it reduces oil consumption, increases the life expectancy of engines and contributes to faster winter starting.

National's automotive equipment has to meet exacting schedules of staff members and to keep our automobiles in tip-top mechanical condition, we are glad to say that CHAMPION Q-X UNDERSURFACE LUBRICANT accomplishes this job.

Sincerely,
Allott W. Yadon
Allott W. Yadon

AWY:lew

For Free Demonstration or technical information: Contact
Champion Products, Inc., Stephenville, Texas
or
Perrin & Sacre Corp., 2816 E. 11th St., Los Angeles, Calif.
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Heard & Silvey Service & Equipment Co., Box 866, Snyder, Texas
Local Rep.—Mr. Harry Lewis.
All American Trading Co., Managua, Nicaragua, C. A.

# NATURAL GAS

## P.C.G.A. to Meet March 7-8

LOS ANGELES.—Panel discussions concerning operation of a mobile radio system, odor-testing devices, and stresses on underground pipe will highlight the meeting of the Pacific Coast Gas Association, March 7-8, at the Ambassador Hotel here.

The panel, consisting of a board of experts who lead discussion and answer questions submitted by the audience, has proved popular in previous conferences.

To permit discussion of a maximum number of topics, the program committee will distribute copies of technical papers in advance to those who plan to attend. This will make it unnecessary for the author to read the entire paper from the floor, and will make more time available for discussion.

Two symposiums will be held, one on March 7 and the other on March 8. The former will feature presentation of technical papers under the general heading, "Instruments and Equipment Used by Technical Services in the Gas Industry." The latter symposium will be concerned with "Corrosion and Cathodic Protection."

Each symposium is divided into subtopics, and these in turn are comprised of from one to three technical papers.

**Symposium 1 will include:** Applications of instruments to engineering services; process-plant operating problems; devices for mechanical sampling of natural fuel gases in transmission and distribution systems; odorization—studies of equipments and methods; technique of salt-crock test; operating telemetering equipment without use of commercial power; and measurement of stresses in underground piping.

**Symposium 2:** Studies on corrosion in galvanized automatic storage-water heaters; choosing suitable insulating fittings; disintegration of a concrete coating on steel pipe by forced current discharge; and cathodic protection.

Civil defense as it affects men in the technical-service group will be discussed by a speaker from the state's gas-system planning subcommittee. L. L. Creighton, Pacific Gas & Electric Co., will talk on "An Integrated Communication System for the Super-Inch Gas-Transmission Line."

## Gas-Export Bill Proposed

OKLAHOMA CITY.—State Sen. James Nevins, of Okmulgee, has announced that the submission of legislation is under consideration here which would prohibit piping or other shipment of natural gas out of Oklahoma until state needs are fully met.

Nevins, chairman of the special senate committee which is investigatings causes that develop natural-gas shortages in cold weather for industrial users in Oklahoma, said he will probably sponsor the bill.

Any legislation of this order is predicted to have a rough road to travel, for the same type of bill has been declared unconstitutional in Louisiana, West Virginia, and Mississippi.

Nevins said, however, that he believes he can avoid errors made by the other states, and produce a bill acceptable to the courts.

Industrial leaders from cities hit by gas shortages are seeking a conference with Gov. Johnston Murray to impress upon him the seriousness of the shortages in their effects on the state's industry, he said.

Meanwhile, a new cold snap in the state brought further gas curtailments by Oklahoma Natural Gas Co., primary supplier of gas in the area, and the Oklahoma Corporation Commission began examining the possibilities of citing the company for contempt.

## Gas Favored for Plants

WASHINGTON.—Rep. Edwin E. Willis (D., La.) said last week that the best way to speed up a "badly fumbled" aluminum-expansion program is to build new plants in the Gulf Coast area where abundant supplies of natural gas are available.

Plants built in Louisiana for instance could quickly convert natural gas into the huge quantities of electric power needed to produce aluminum, he said.

Willis, a member of a House judiciary subcommittee which recently completed an investigation of bottlenecks in the expansion program, stated that hydroelectric power is cheaper than gas-generated power, but takes much longer to get in operation.

It is clear, therefore, that to fill 1951 and 1952 aluminum needs, the country must utilize existing plants, plus the potential output in the natural-gas regions, he said.

## Carbon-Black Output Up

WASHINGTON.—Production of carbon black in the United States increased 13 per cent in 1950 over 1949, largely due to a jump in furnace-black output, the Bureau of Mines has announced.

United States plants produced a total of 1,381,483,000 lb. during 1950. Output of furnace black increased 28 per cent to 764,830,000 lb., while contact-black production fell off 2 per cent to 616,653,000 lb.

In line with the increased production, 1950 shipments rose 34 per cent to 1,506,736,000 lb.

Exports of both types of carbon black totaled 365,697,000 lb. for the first 11 months of 1950 as compared with 276,545,000 lb. for the corresponding period in 1949.

The bureau reported that stocks of carbon black declined from a 65-day supply at the end of 1949 to a 21-day supply at the end of 1950.

# Natural Gasoline

## N.G.A.A. Sponsors Seminar

FORT WORTH.—Current procedures and equipment for determining the constituents of natural gases and natural-gas liquids by means of low-temperature fractional analysis will be studied by plant chemists at a 2-day seminar scheduled for March 15-16 in the Texas Hotel here by the Natural Gasoline Association of America.

Varied techniques of the analytical method will be discussed in detail by experienced men in the field including Dr. Walter Podbielniak, Podbielniak, Inc., Chicago; D. E. Smith, Phillips Petroleum Co., Bartlesville, Okla.; Joe F. Wood, Skelly Oil Co., Pawhuska, Okla.; H. A. Montgomery, Warren Petroleum Corp., Dallas; M. F. Wirges, Cities Service Oil Co., Bartlesville; J. L. Thompson, Lone Star Producing Co., Dallas; E. H. Counts, Sinclair Oil & Refining Co., Tulsa; and W. D. Asher, Atlantic Refining Co., Dallas.

More than 200 laboratory supervisors and technicians are expected to attend the seminar, which is an outgrowth of 2 years of research under N.G.A.A. sponsorship in which 58 oil companies and commercial laboratories cooperated in analysis studies.

Tentative plans are being made to hold similar seminars of 4-days duration so that full-scale demonstrations with the most improved and analytical equipment can be made.

## Plant Enlargement O.K.'d

ULYSSES, Kans.—Plans of Stanolind Oil & Gas Co. to enlarge its big natural-gasoline plant here were approved by the Kansas Corporation Commission last week.

These expansion plans when completed will increase rated capacity of the Ulysses plant from 100,000,000 cu. ft. of gas per day to 325,000,000 cu. ft. Recovery is estimated to run about 196,000 gal. of liquefied petroleum gas and 88,000 gal. of natural gasoline daily.

The plant will produce liquefied petroleum gas and 12-26 lb. R.v.p. natural gasoline by absorption process, and sell residue gas to Cities Service Gas Co.

At the present 100,000,000 cu. ft. per day capacity, the plant produces 26,663 gal. of 12-26 lb. R.v.p. natural gasoline and 36,694 gal. of liquefied petroleum gas daily.

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CD is specially compounded to prevent crystallization during prolonged exposure to cold weather.

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UOP Copper Deactivator is available at Universal's six strategically located warehouses in 5 and 30 gallon resin-lined drums holding 40 and 250 pounds net. The small containers provide convenience in handling.

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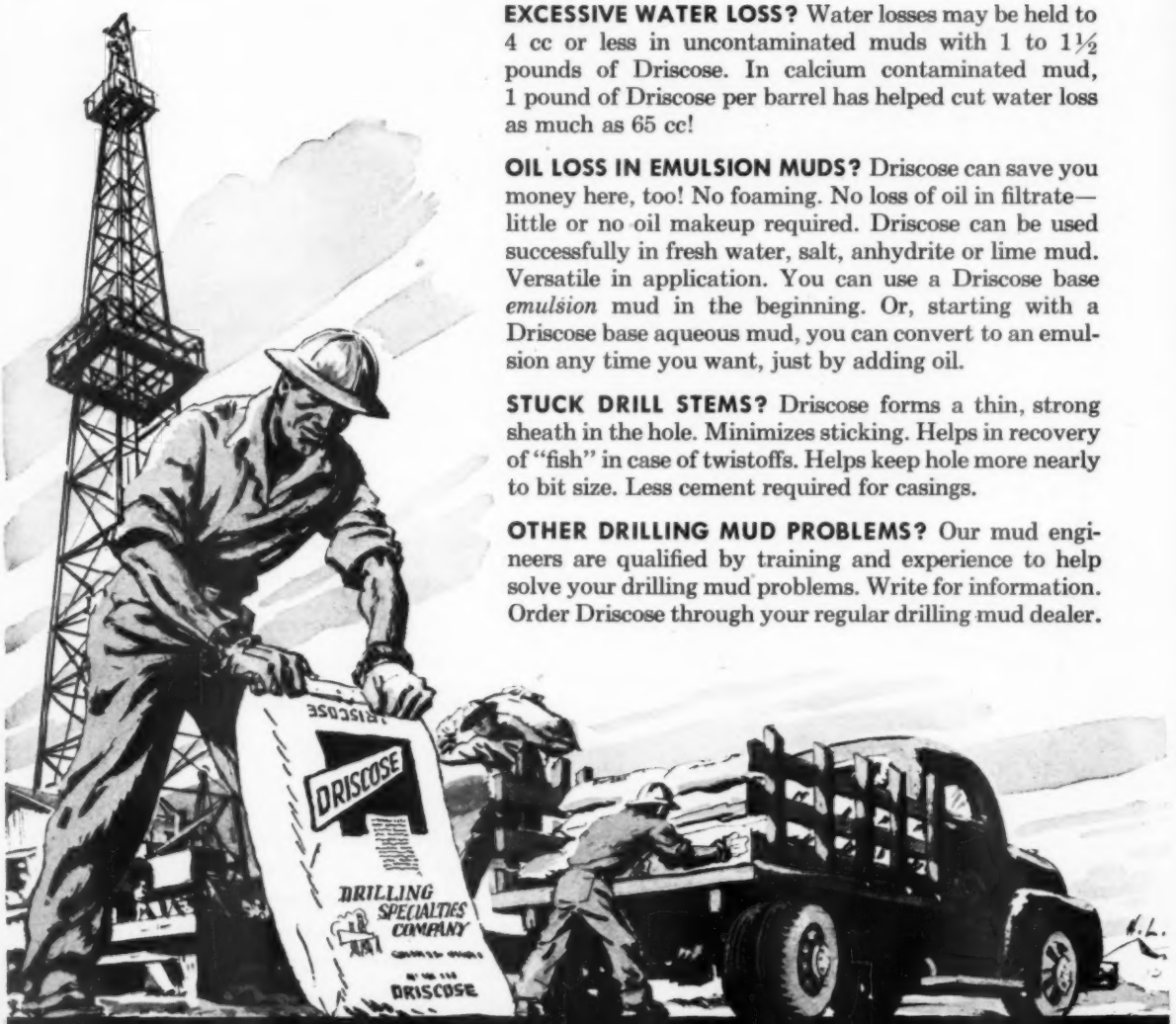


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REPORTS ON

# Exploration and Drilling

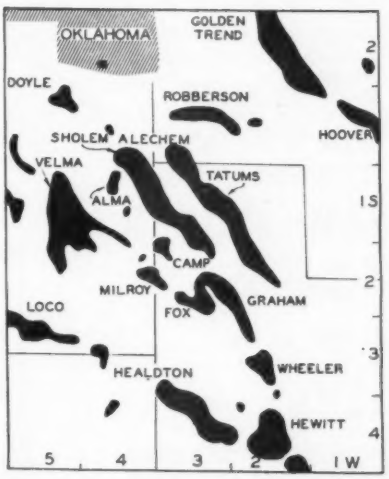
## Oklahoma Activity Concentration

FEATURING the discovery and development of large reserves is the concentration of drilling activity in the southwestern area of Oklahoma in and around the old multipay fields of Velma, Sholem Alechem, and Fox-Graham. Because of the complexity of the geology of this area, most of the drilling is best described as being of an exploratory - development nature.

It was between 25 and 30 years ago that the original major accumulations in this area were opened. Development was in the Pennsylvanian-Deese and Hoxbar, principally, but substantial production was developed from Permian stringers in some areas. Later, deeper horizons (Hunton, Simpson, and Arbuckle) were tapped, but production from these rocks has been comparatively insignificant. The big fields were approaching senility when a revival was set off by a well completed a little over 6 years ago.

What did this well find that attracted and has held a concentration of activity in this old producing area? The answer lies in a series of thick, fine-grained oil-bearing sands in the Pennsylvanian-Springer (lower Dornick Hills-Springer). This sand series was truncated along a "hinge line" paralleling the eastern side of the tremendous, steeply dipping Velma anticline, prior to deposition of the Deese, to establish a long narrow trap which accounts for a belt of Springer production down the eastern side of Velma and extending southeastward from the main body of the field. Northeastward from Velma the Springer crosses a small buried "ridge" which controls production in the Alma area. It then rises on to the Sholem Alechem anticline, crosses it, and drops down into the low between that field and Tatums. Continuing eastward it climbs up onto the Tatums structure, drops, and then outcrops in the Arbuckle Mountains a short distance to the east.

Oil-bearing sands of the Springer have been found as far north as the southwest flank of Knox field, which trends northwestward from the northwest corner of sketch map. No oil-bearing section of the Springer has been found in the area between the Velma - Milroy and Loco - Healdton trends. On to the southwest in the Marietta basin, once believed to be a




Springer basin, the Springer is absent.

It is not only the Springer that is supplying the incentive for drilling in this area, however. As a result of efforts originally aimed for the Springer additional areas of Deese were uncovered to extend former areas and open new ones.

The current drilling campaign began back in 1944 when Skelly Oil Co. stepped off from Velma field and drilled a well in 24-1s-5w into the Springer section to become the most famous discovery in the Ardmore basin in recent years. The significance of this new pay was soon recognized but due to complicated geology and established leases, development was slow to gain momentum. About the time that development really got under way in this area, Stanolind Oil & Gas Co. found Springer production on the north flank of Sholem Alechem at its 1 Sims, 2-1s-4w, which in itself was an unspectacular well but was enough to set off development which was soon to prove that an enormous reserve existed in rocks stratigraphically older than those previously produced on this steeply folded anticline.

Then began a series of "discoveries" which continues today. Many of these discoveries have already been proved to be only extensions of either or both the Springer and Deese formations. Last year's largest single addition to Oklahoma's proven reserves, North Milroy, may ultimately prove to be just another extension as development of Springer production continues to crawl southeastward from Velma. *Philip C. Ingalls.*

### HIGHLIGHTS OF WEEK'S DEVELOPMENTS

**WEST TEXAS.**—C. W. Murchison 1 Cannon, Pegasus field extender previously reported as a dual completion from the Pennsylvanian and Ellenburger formations, had formation water in the Ellenburger. The lower formation is to be cemented off and completion made from the Pennsylvanian. Nelson B. Hunt 1 Shropshire, southeast Hockley County "tight" wildcat, has been reported dry at 11,500 ft. A 1-hour drill-stem test at 11,030-300 ft., believed to be in the Ellenburger, recovered 180 ft. of gas-cut mud.

**SOUTH LOUISIANA.**—California Co. has recorded discoveries on its Lake Coquille prospect, at two wildcats in Plaquemines Parish: 1 Louisiana State Lease 1,785, 20-19s-18e, and 1 State Lease 1,786, 22-19s-18e. Through perforations at 10,582-94 ft., State Lease 1,785 flowed 159 bbl. of 37.1°-gravity oil daily. The 1 State Lease 1,786 flowed 400 bbl. of 33.9°-gravity oil per day through 9/64-in. choke.

**MISSISSIPPI.**—The state's third discovery for the year is being completed at Sinclair Oil & Gas Co. 1 R. T. Liddell et al, 67-9n-1e, Jefferson County. Through perforations in the lower Tuscaloosa, the well flowed 11 bbl. of 57.8°-gravity condensate per hour.



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# South Louisiana

## Plaquemines Parish Gets New Oil Pool

NEW ORLEANS.—The California Co. has opened a new oil pool at its Lake Coquille prospect, 1 Louisiana State 1,786, 22-19s-18e, Plaquemines Parish, in the extreme southeastern part of Louisiana. The well is credited with flowing 400 bbl. of 33.9°-gravity oil daily through 9/64-in. choke. Total depth of the wildcat is 11,500 ft. with oil string set at 11,489 ft. Production is through perforations at 11,394-406 ft. Tubing pressure was 3,100 psi. The firm is currently drilling a second test on the Lake Coquille prospect, 1 Louisiana State Lease 1,785, 20-19-18e, Plaquemines Parish.

Another new field has been opened at Fidelity Oil & Royalty Co. 1 Edgewood Land & Logging Co., 18-6s-9w, Beauregard Parish. On initial test, the well flowed 160 bbl. of oil per day through casing perforations at 8,522-46 ft. Flow was gaged through a ⅛-in. choke, with tubing pressure of 1,125 psi. and flowing pressure 1,300 psi. The well is now shut in awaiting official potential test.

Sun Oil Co. and associates are continuing a series of tests at 1 Zenor, gas discovery in 42-15s-11e, St. Mary Parish. Total depth of the wildcat is 13,596 ft. with 5-in. liner cemented on bottom. Tests are currently being conducted through casing perforations at 11,385-92 ft. On open flow, the well gaged 18,000,000 cu. ft. of gas per day, and through a ⅛-in. choke it produced 1,303,000 cu. ft. per day. Tubing pressure was 3,815 psi. Operator then changed to 12/64-in. choke, through which the well flowed 2,813,000 cu. ft. with tubing pressure 3,565 psi. Shut-in pressure was 4,115 psi. Some condensate was reported on initial test of perforations at 11,385-92 ft., however, latest gages released by Sun gave no indication of any being present. Previous tests were run from 11,413-13 ft., from which the well flowed some oil and wash water. Salt water encroachment forced the operator to squeeze these perforations.

In Avoyelles Parish, Lamar Hunt Trust Estate 1 Max M. Herrick, 13-1s-4e, wildcat 2 miles south of Longbridge is drilling below 7,591 ft.

**SOUTH LOUISIANA WILDCAT FAILURES**

Calcasieu Parish: Hankamer Investment Co. 1 Bob James, 32-10s-9w, dry, TD 9,601 ft.

St. James Parish: The Texas Co. 1 Mrs. Josephine A. Stewart, 6-12s-17e, dry, TD 11,000 ft.

St. John the Baptist Parish: Shell Oil Co., Inc. 1 State Lease 1,838, 13s-19e, dry, TD 11,890 ft.


Up to 22 times more operations
WITHOUT RE-LUBRICATING
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LUBRICATED PLUG
VALVES

| TEST RECORD | NO. OF OPERATIONS Without RE-LUBRICATING |
|---|---|
| VALVE | |
| VALVE "A" | 5 |
| VALVE "B" | 33 |
| HOMESTEAD-REISER VALVE | 110 |

Each valve assembled with the manufacturer's recommended lubricant. Test made on 75 lb. air pressure.

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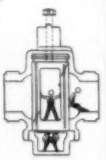

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# California

## Mounting Interest in Castaic Junction Area

LOS ANGELES.—Wildcatting and development activity in the vicinity of Castaic Junction, west central Los Angeles County, is being closely watched by California companies. Last year saw the discovery of Castaic Junction and Honor Rancho fields, the former being about 1½ miles southeast of the junction and the latter an equal distance to the north. Current interest is caused by extension attempts and wildcats seeking similar deep fields.

About ½ mile west of the two-well, two-zone Honor Rancho field, Humble Oil & Refining Co. and British American Producing Co. last week had reached 8,350 ft. at their C-1 Newhall Land & Farming Co. One location east of its 6,500-ft. zone discovery well, The Texas Co. was nearing 4,700 ft.

Probably the most closely watched test, however, was Humble B-1 Newhall Land midway between the two fields. It was drilling below 10,300 ft. East of the three-well, two-zone Castaic Junction field about ¾ mile, Humble 4 Newhall Land also was below 10,300 ft.

All of the Humble tests probably will be carried to depths somewhere near 11,500 ft. to check possibilities in the Miocene-Modelo sands which Humble 1 and 3 Newhall Land opened to production last year. About 175 ft. of condensate and oil sand were encountered at around 11,700 ft. in 1 Newhall and 3 Newhall was completed in a 100-ft. (net) oil sand at about 9,800 ft.

Other activity in the area included Superior Oil Co. 14-23 Bonelli, about 5 miles east of Castaic Junction, in 23-4n-16w, and The Texas Co. 1 Daries, about 7 miles north of Honor Rancho. In the nearby Del Valle and Newhall-Potrero fields an additional 10 rigs are at work.

**CALIFORNIA SUCCESSFUL WILDCAT**

Kern County, Elk Hills field, new upper Stevens zone sand discovery: Standard Oil Co. of California 312-36R U.O.N.-P.R., 36-30s-23e, flowed at rate of 2,900 bbl. of oil per day through perforations at 6,958-6,845, 6,830-6,665, 6,650-6,475 ft., 34.4° gravity, 1-in. bean, 0.2 per cent cut, top oil sand 5,825 ft., base oil sand 6,972 ft., TD 7,016 ft., elev. 1,346 ft.

**CALIFORNIA UNSUCCESSFUL WILDCATS**

Los Angeles County, Castaic area: Macson Oil Co. 2 Radovich, 26-5n-17w, dry, TD 1,048 ft., elev. 1,365 ft.

San Luis Obispo County, Cuyama Valley area: Richfield Oil Corp. A-3 DeKoch, 11-11n-29w, dry, TD 3,658 ft., elev. 1,533 ft.

Santa Barbara County, Goleta area: Santa Goleta Pet. Co. 1 Santa Claus, 10-4n-29w, dry, TD 1,766 ft., elev. 310 ft.

# This is the tool that is revolutionizing drill string protection on today's wells!

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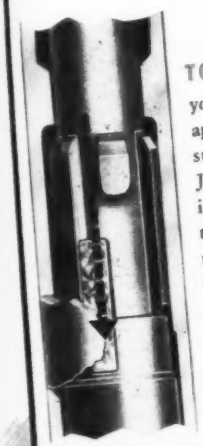
This is the *only* tool of its kind—the ONE tool that combines BOTH *Jarring* and *Releasing* action—each under the full control of the operator—for protecting modern drill strings, whether deep or shallow. And not only does it combine in *one* tool the protection usually requiring several tools, but it also provides unique operating advantages *found in no other single tool or combination of tools!*

## Briefly, here's how it operates . . .



### TO USE AS A BUMPER SUB

you need only slack the weight of approximately 2,000 feet of drill string upon the Bumper Safety Joint. This weight actuates a positive tripping mechanism which trips *automatically*, allowing the tool to strike a sharp downward blow. Raising the pipe then *automatically* resets the tool for another blow. Blows can be struck repeatedly and continuously by simply raising and lowering the drill string.

### TO USE AS A SAFETY JOINT

for quick release from stuck drill collars in the event they cannot be loosened, you simply slack the tripping weight of the string on the Bumper Safety Joint and apply left torque as the string is slowly raised. The slight reverse torque rotates the drive keys into an unlocking slot similar to a "J" tool, so that, by simply continuing to raise the string, complete release from the lower portion of the drill string is effected. Further, the mandrel remaining in the hole is smaller in diameter than the drill collars, thus greatly facilitating fishing operations in tight holes!

## TYPICAL SERVICE RECORDS

**On job after job—from the shallowest wells right down to world's record depth—the Shaffer-Waggener Bumper Safety Joint is bringing new safety, new efficiency to modern drilling operations. Here are a few typical accomplishments . . .**

- The Shaffer-Waggener Bumper Safety Joint has been used successfully in extreme directionally-drilled wells where a slant of 60° was maintained.
- The Shaffer-Waggener Bumper Safety Joint has been released and reconnected from a 30° angle at a depth of 8,500 ft.
- At 16,883 feet in the world's deepest well the Shaffer-Waggener Bumper Safety Joint proved invaluable in simplifying a recovery operation. A Bumper Safety Joint was being used between the drill collars and drill pipe when the string parted going into the hole, dropping over 2,400 feet of pipe and drill collars 5,000 feet to the bottom of the well at 16,883 feet. The top of the fish was gripped with a socket and the Bumper Safety Joint released, immediately recovering 2,100 feet of drill pipe. The upper part of the Bumper Safety Joint was then run back into the hole below a set of jars, reconnected to the lower half of the Bumper Safety Joint and—after jarring—the drill collars were completely recovered, leaving the hole clean.

***Note: For maximum protection many operators are using the Bumper Safety Joint above wash-over strings to facilitate recovery should the string become stuck.***

**Whether used as a Bumper Sub or as a Safety Joint, the Shaffer-Waggener Bumper Safety Joint provides unique advantages found in no other tool—advantages too numerous to outline here but which are described in detail in a descriptive bulletin which will gladly be sent you on request. Send today for your free copy of this informative eight page bulletin!**

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Solvang area: Humble Oil & Ref. Co. 1 Florence R. Selby, 14-6n-31w, dry, TD 3,810 ft., elev. 658 ft.

Tulare County, Trico area: Trico Oil & Gas Co. 1 Heitzeg, 36-24s-23e, dry, top Mya 2,496 ft., top Atwell 3,270 ft., TD 3,312 ft.

# Mississippi

## Another Gas-Condensate Discovery for Ole Miss

JACKSON.—Mississippi's third gas-condensate discovery of the year is being completed at Sinclair Oil & Gas Co. 1 R. T. Liddell, et al, 67-9n-1e, Jefferson County. Through casing perforations in the lower Tuscaloosa sand at 10,072-81 ft., the well tested 11 bbl. of 57.8°-gravity condensate per hour through ¼-in. top and ⅝-in. bottom chokes. Flowing pressure was 2,800 psi. and gas-oil ratio was 9,300 to 1. The test was free of water. Tanks are currently being erected and separator installed for final testing.

Lion Oil Co. has junked and abandoned its 1 Denkmann, 22-7n-4w, after fishing for 8 weeks. This projected Smackover test had been drilled to 13,186 ft. in the Cotton Valley section when a fishing job developed that became more complicated as time wore on. When the hole was junked, the fish consisted of 11 drill collars, 4 rock bits, and 5 joints of drill pipe scattered up and down the hole between 4,800 ft. and total depth. No shows of any significance were encountered in the wildcat, which is located in the Goshen Springs area of Rankin County. It is reported that a few pieces of hard sand in cuttings from the Cotton Valley had slight fluorescence and ether cut, but no drilling break was encountered.

In Perry County, approximately 4 miles south of the town of Richton, Union Producing Co. is reported completing negotiations for a test to top of Lower Cretaceous in SW SE 19-4n-9w. The wildcat will be started within the next 60 to 90 days. The proposed location is approximately 3 miles south and slightly east of Richton salt dome.

Gulf Refining Co. has announced location for its first Wilcox attempt in Cranfield field, Adams County. The test, 18 Ella G. Lees, 49-7n-1w, is scheduled for 5,500 ft. It is located approximately 300 ft. south of same operator's 8 Ella G. Lees, which produces from the lower Tuscaloosa. Only the lower Tuscaloosa reservoir is under field-wide unit operation.

### MISSISSIPPI WILDCAT FAILURES

Adams County: Paul Ratliff et al 1 Leslie Kaiser, 26-7n-2w, dry, TD 6,509 ft.

Franklin County: Barnett Serio 1 Henry Rowland, 17-6n-1e, dry, TD 6,776 ft.

Jefferson County: Pan-Am Southern Corp. 1 James McClure, 31-8n-1e, dry, TD 6,225 ft.

Lauderdale County: Thayer-Boswell et al 1 A. B. Harper Estate, 7-6n-17e, dry, TD 5,830 ft.

Rankin County: Lion Oil Co. 1 Denkmann, 11-7n-4e, dry, TD 13,186 ft.

# Texas Gulf Coast

## Yequa Sand Discovery In Hardin County

HOUSTON.—Stanolind Oil & Gas Co.-Freeport Sulphur Co. 1 Kirby Lumber Co., wildcat test 3 miles northeast of Batson in Hardin County, has been completed as a new oil discovery for the area. On potential test the well flowed 275 bbl. of 37.5°-gravity oil per day through perforations at 7,230-40 ft. in the Yegua sand. Tubing pressure was 345 psi. This well was originally drilled to a depth of 7,284 ft. by Freeport Sulphur, at which depth the company was unable to recover stuck drill pipe. Stanolind took over the operation, sidetracked the hole and drilled it to total depth of 7,400 ft. Location is in the Hardin County School Land Survey, Abstract 260.

A new and shallower sand has been opened in the Arcola area of Brazoria County at Floyd Karsten 1 H. F. Hanson, J. S. Talmadge Survey, 1,040 ft. east of 1 Sharp, field discovery well. Through perforations at 7,012-14 ft., the well flowed 69 bbl. of 41°-gravity oil daily through 6/64-in. choke. Tubing pressure was 1,825 psi. and casing pressure was 2,825 psi.

Union Producing Co. has brought in a new oil discovery in the Fulshear area 3 miles south of Katy, Fort Bend County. The company's 1 Watson, S. Hobermaker Survey, A-189, is bottomed at 8,003 ft. and cased with 7-in. at 7,471 ft. Operator perforated at 6,837-39 ft. with 20 shots, and the well flowed at an estimated rate of 5 bbl. of 38°-gravity oil per hour while cleaning, being 30 per cent basic sediment. Flow was gaged through a ⅛-in. choke, and tubing pressure was 550 psi.

Paul J. Fly et al 1 K. M. Lewis, south offset to West Terrell Point field discovery, Goliad County, tested salt water in perforations at 4,654-64 ft., then squeezed and reperforated at 4,636-40 ft. The well flowed gas through ¼-in. choke, with 1,725 psi. working pressure. By electrical log and sidewall samples, the well topped a sand with good oil shows at 4,906 ft. Drill-stem test of this section, prior to setting casing, found very little pressure but swabbed oil. This was the last test before setting pipe. Total depth is 5,015 ft., with 4½-in. pipe set to 4,908 ft. The well is located in W. P. Patterson Survey, Abstract 325, 5 miles southeast of Fannin.

### TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCAT

Hardin County: New pool—Stanolind Oil & Gas Co.-Freeport Sulphur Co. 1 Kirby Corp., Hardin County School Land Sur., A-260, 3 mi. NE of Batson, TD 7,400 ft., perf. (Yegua) 7,230-40 ft., IP: 275 bbl. oil per day, 12/64-in. choke, TP 345 psi., 37.5° gravity.

### TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Brazoria County: Brazos Oil & Gas Co. 1 Louise Rau, H. Austin Sur., A-14, dry, TD 10,302 ft.

DeWitt County: J. A. Gray 1 O. A. Zengerle Unit 1, Mumford House Sur., A-226, dry, TD 7,692 ft.

Harris County: J. Leonard David & Son 1 Williams, Victor Blanco Sur., A-2, dry, TD 5,922 ft.

Jackson County: The Texas Co. 1 R. G. Sanders, R. D. Moore Sur., A-55, dry, TD 10,083 ft.

Karnes County: George W. Graham et al 1 Deborah, William Gutherie Sur., A-119, 2 mi. SE of Runge, dry, TD 7,025 ft.

Union Sulphur & Oil Corp. 1 M. E. Wolters et al, Valentine Mimms Sur., A-386, 7 mi. SE of Runge, dry, TD 7,569 ft.

Orange County: Hunt Trust Estate 1 Clark, John Jett Sur., A-15, 6½ mi. SW of Orange, dry, TD 8,016 ft.

Walker County: Garrett Production Co. 1 Belnowski, G. A. Sleight Sur., A-496, 2 mi. W of New Waverly, dry, TD 3,460 ft.

Washington County: Mayo & Foretisch et al 1 Parker, M. A. Early Sur., A-40, 5 mi. SW of Washington, dry, TD 6,016 ft.

Wharton County: W. V. Hardin 1 Youngdale, ET RR Sur. 108, 4 mi. SE of El Campo, dry, TD 4,613 ft.

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XUM

# Oklahoma

## Beaver Pool Bolstered By Confirmation Well

THE new Beaver pool, located northwest of Marlow in northwestern Stephens County, received additional confirmation and further importance with the completion by Peppers Refining Co. of another good well, the best to date. It is 1 Adkins, NW NW SE 4-2n-8w, north offset to the discovery well on a 40-acre spacing pattern. Producing from the Pennsylvanian Hoxbar sands, the well flowed 840 bbl. of clean oil on a 9-hour run through open 2-in. tubing. With flow restricted to 12/64-in. choke, it made 230 bbl. in a 24-hour period. Gravity of the oil is 38°.

For the completion, casing was run through the section and perforated at 6,996-7,044 ft., 7,060-88 ft., 7,124-38 ft., and 7,144-64 ft.

The pool, located just south of the Grady County line, was opened last September by the same operator's 1 Smith, NW SE SE 4.

About 15 miles to the northeast in southeastern Grady County, Dick Wagoner is extending production of the Knox pool at his 1 Todd, SW SE SE 1-3n-6w. The well, located west of production at the north end of the pool, swabbed 186 bbl. of oil in a 24-hour initial test and now is being put on the pump for completion. It also produces from the Hoxbar sand, opposite which casing was perforated at 4,718-30 ft. Total depth is 4,865 ft. with casing at 4,840 ft.

Revival of the abandoned North Coyle pool in western Payne County is in prospect with John Lindas Oil, Inc., preparing to test promising oil and gas showings found in its 1 Cook, SW SE SE 25-18n-1e. Showings were in Hunton lime, the producing horizon of the two other wells, now abandoned, which have been completed in the pool. A drill-stem test at 4,700-10 ft. in the top of this zone got a good gas flow. Another test taking in an interval at 4,706-16 ft. yielded 50 ft. of oil and gas-cut mud and 85 ft. of heavily oil and gas-cut water, with an additional 5 ft. of water. Casing has been run through this zone to 4,747 ft. and will be perforated for production tests. Hole was drilled to 5,066 ft. in the second Wilcox sand, which was dry.

Discovery of another new pool in western Osage County is indicated by showings encountered by The Texas Co. in its 1 Woodward, NW NW SE 19-24n-4e. Three zones, Layton sand, Cleveland sand, and Mississippi chat, carried showings. A drill-stem test in Layton sand at 2,590-2,613 ft. yielded 90 ft. of heavily oil-cut mud. Another in Cleveland sand at 2,833-51 ft. got 10 ft. of oil-cut mud. The third in Mississippi chat at 3,430-60 ft. got 620 ft. of heavily gas-cut mud and 10 ft. of heavily oil-cut mud. Hole was drilled to 3,886 ft. with no further showings. Casing was run through the above zones to 3,570 ft.

### OKLAHOMA WILDCAT FAILURES

Beckham County: Carter Oil Co. 1 Oliver Duggins C-307, NW NW NW 6-8n-21w, dry, TD 3,432 ft., base Panhandle lime-top Cisco 2,718 (?) ft.

Carter County: Stanolind Oil & Gas Co. 1 Gant, SW SW SE 30-2s-3w, dry, TD 7,503 ft., Deese 3,190 ft., fusilinid zone 4,245 ft., Tussy 4,920 ft., upper Dornick Hills 5,730 ft., lower Dornick Hills 6,063 ft., Springer 6,285 ft., "X" sand (Markham) 6,300 ft., "A" sand (Aldridge 6,630 ft., "B" sand (Humphrey) 6,905 ft., "C" sand (Simpson) 7,306 ft., sandy lime 7,395 ft.

Cotton County: J. L. Webb 1 Benson, NW NE NE 35-4s-11w, dry, TD 1,965 ft., sand 1,178 ft., broken sand 1,596 ft., sand 1,638 ft., 1,692 ft., 1,794 ft., 1,847 ft., and 1,948 ft.

Hughes County: S. A. Kind and Dan Rives et al 1 Cordell, SW SE SE 13-8n-8e, dry, TD 3,477 ft., Calvin sand 800 ft., Henryetta coal 1,390 ft., Earlsboro 2,030 ft., Inola lime 2,275 ft., lime 2,630 ft.,

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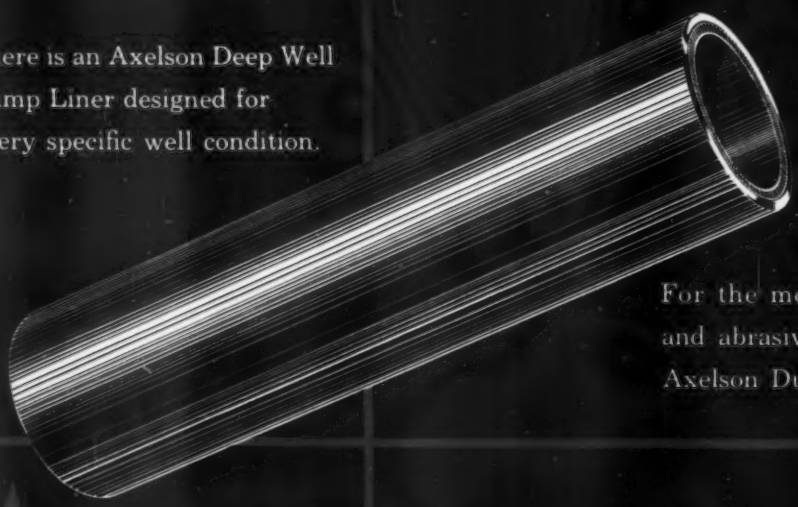

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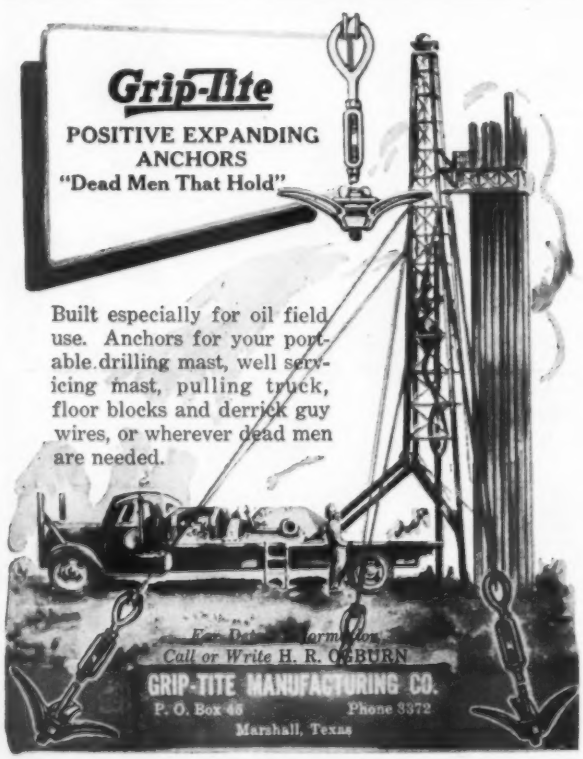

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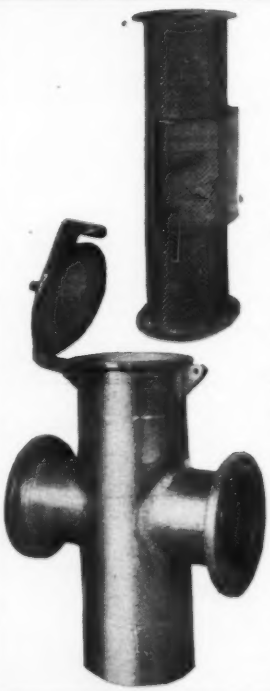

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upper Booch 2,740 ft., lower Booch 2,808 ft., Gilcrease 3,020 ft., Union Valley-Cromwell 3,360 ft.

Lincoln County: Dirickson-Lewis Drilling Co. 1 Robinson, SE SE NW 32-17n-6e, dry, TD 3,335 ft., Big lime 2,792 ft., Hogshooter 1,896 ft., Layton 1,952 ft., Checkerboard 2,206 ft., conglomerate 2,235 ft., Oswego 2,814 ft., Prue 2,861 ft., Verdigris 2,954 ft., Skinner 2,966 ft., lime 3,116 ft., Red Fork 3,156 ft., Inola 3,248 ft., Bartlesville 3,266 ft., Bartlesville sand 3,296 ft.

Okfuskee County: K. A. Ellison et al 1 Radar, SW SE SW 5-13n-9e, dry, TD 3,995 ft., Skinner sand 2,278 ft., Inola 2,768 ft., upper Bartlesville 2,824 ft., lower Bartlesville 2,866 ft., lime 2,980 ft., Dutcher 3,288 ft., Union Valley 3,310 ft., Cromwell 3,320 ft., Pitken 3,336 ft., Woodford 3,827 ft., Hunton 3,842 ft., Viola 3,930 ft., Wilcox 3,983 ft.

Stephens County: Deep Rock Oil Corp. 1 Southerland, NW NW SW 5-3s-4w, dry, TD 5,789 ft., upper Loco 1,095 ft., lower Loco 1,225 ft., Checkerboard 2,942 ft., Deese 3,025 ft., Arbuckle conglomerate 3,658 ft., Simpson conglomerate 4,430 ft., Simpson sand 4,480 ft., broken sand and shale 4,553 ft., sand 4,575 ft., McLish lime 5,515 ft., lime 5,530 ft., Oil Creek 5,705 ft.

# Kansas

## Phillips County Wildcat Showing for Production

ANOTHER new pool for the Huffstutter area in northern Phillips County, where active exploration extending across the Nebraska line has been under way for some time, appears to be in the making where Honaker Drilling Co. is testing its 1 Kent, NE SE SE 22-1-18. In initial swabbing tests the well produced at the rate of 1 bbl. per hour. Total depth is 3,505 ft. in Lansing lime, topped at 3,337 ft. (—1,180 ft.). Hole is open from 3,504 ft. The zone was opened with 500 gal. of acid prior to testing. Location is about 2 miles northeast of the Huffstutter pool.

About 5 miles further east in the SW SW SW 21-1-17, same county, Westgate-Greenland Oil Co. and Bay Petroleum Corp. also has found promising oil showings in the same zone at its 1 Rolland. A drill-stem test at 3,548-91 ft. with tester open 1 hour yielded 100 ft. of oil-cut mud. Lansing was topped at 3,484 ft. (—1,283 ft.). At latest report, operators were drilling ahead.

C. E. Ash and L. B. Smith 1-B Musenberry, SE SE NW 10-19-11, a wildcat 1½ miles west of the Rick pool, eastern Barton County, produced 396 bbl. of oil per day on potential tests. It opens the Bernard pool. Production is from the Lansing-Kansas City section, opposite which casing was perforated at 3,224-30 ft. Top of the section is 3,053 ft (—1,276 ft.). Hole was drilled to the Arbuckle, logged at 3,337-67 ft. The deeper horizon failed to produce.

In the Ellinwood area, same county, about 6 miles to the southwest of the Bernard pool discovery, another wildcat, B & R Drilling Co. 1 Johnson, SW SW SW 27-19-12, found promising oil showings in Arbuckle lime and has casing run to test. It is about a mile west of nearest production in the Hammer pool. Top of the pay is 3,362 ft. (—1,549 ft.), where casing was cemented. Total depth of the rotary hole is 3,365 ft.

### KANSAS SUCCESSFUL WILDCATS

Barton County: Adair-Holly 1 Everleigh-Argo, SE SE NW 31-17s-12w, pumped 240 bbl. oil per day from Arbuckle at 3,322-31 ft., TD; anhydrite 695 ft., Heebner 2,970 ft., lime 3,070 ft., Lansing-Kansas City 3,082 ft., opens NW Redwing pool.

Pawnee County: Stanolind Oil & Gas Co. 1 Evers, NE NW NE 1-22s-16w, 58 bbl. oil per day from Lansing at 3,525-31 ft., TD 3,972 ft., anhydrite 944 ft., Heebner 3,382 ft., lime 3,479 ft., cherty Sooy 3,795 ft., Simpson 3,850 ft., Arbuckle 3,914 ft.

### KANSAS WILDCAT FAILURES

Barton County: Isern Bros. 1 Brown, NE NE SE 21-19s-12w, dry, TD 3,481 ft., anhydrite 670 ft., Heebner 3,045 ft., lime 3,157 ft., Lansing-Kansas City 3,173 ft., Sooy 3,432 ft., Arbuckle 3,476 ft.

Crowe 1 Dodge, NE NE SW 14-19s-13w, dry, TD 3,530 ft., anhydrite 775 ft., Heebner 3,115 ft., lime 3,216 ft., Lansing-Kansas City 3,233 ft., Sooy 3,468 ft., Arbuckle 3,493 ft.

Butler County: Elwell-Clare 1 Elwell, NE NE SW 15-27s-3e, dry, TD 3,217 ft., Heebner 1,759 ft., Toronto 1,771 ft., Douglas 2,031 ft., Lansing 2,036 ft., Kansas City 2,334 ft., Mississippi lime 2,850 ft., Kinderhook 3,035 ft., Simpson 3,104 ft., Arbuckle 3,185 ft.

Graham County: Wood River Oil Co. 1 Billips, SW SW NE 18-6s-22w, dry, TD 4,002 ft., Kansas City 3,626 ft., Arbuckle 3,980 ft.

B & R et al 1 Swank, SW SW NE 4-9s-22w, dry, TD 3,945 ft., Topeka 3,254 ft., Lansing-Kansas City 3,516 ft., cherty Sooy 3,890 ft., reworked Arbuckle 3,913 ft., Arbuckle 3,926 ft.

Raymond 1 Keith, SE SE NW 21-9s-24w, dry, TD 5,613 ft., anhydrite 2,227 ft., Heebner 3,678 ft., Lansing-Kansas City 3,721 ft., Sooy 4,160 ft., Mississippi lime 4,358 ft., Arbuckle 4,533 ft.

Greenwood County: Epp 1 fee, NE NE NE 4-25s-12e, dry, TD 1,835 ft., Mississippi lime 1,692 ft.

Kingman County: Drillers Producing Co. 1 Hurn, SW SW SE 28-27s-5w, dry, TD 3,870 ft., lime 2,963 ft., Lansing-Kansas City 2,990 ft., Mississippi chert 3,758 ft., Mississippi dolomite 3,778 ft.

Morris County: Champlin 1 Schruben, NW SW SW 5-15s-9e, dry, TD 3,365 ft., base Oread 1,336 ft., Lansing 1,570 ft., Kansas City 1,704 ft., base Ft. Sill 2,120 ft., sand 2,514 ft., Mississippi lime 2,517 ft., Hunton 2,903 ft., Maquoketa shale 3,080 ft., Viola 3,160 ft., St. Peter 3,271 ft., Arbuckle 3,335 ft.

Nemaha County: L. J. Ryan 1 Aberle, SW NW NW 3-3s-14e, dry, TD 3,798 ft., Mississippi lime 2,574 ft., Hunton 3,014 ft., Maquoketa shale 3,644 ft., Viola 3,699 ft.

Phillips County: Laura 1 Maddox, SE SE NE 14-5s-18w, dry, TD 3,600 ft., Topeka 2,937 ft., Heebner 3,145 ft., Toronto 3,164 ft., Lansing-Kansas City 3,185 ft., Sooy 3,526 ft., Arbuckle 3,566 ft.

Westgate-Greenland 1 Becker, SE SE NW 6-5s-19w, dry, TD 3,588 ft., anhydrite 1,507 ft., Heebner 3,213 ft., Toronto 3,239 ft., Lansing-Kansas City 3,259 ft.

Pottawatomie County: E. A. Hawley 1 Pendergast, SE SW SE 8-7s-9e, dry, TD 1,825 ft., Lansing-Kansas City 1,164 ft., Viola 1,500 ft., Simpson 1,734 ft., Arbuckle 1,818 ft., Reagan 1,822 ft., pre-Cambrian 1,824 ft.

Reno County: Stag 1 Strandberg, NW NW NW 24-23s-5w, dry, TD 3,910 ft., anhydrite 639 ft., Heebner 2,481 ft., Lansing-Kansas City 2,701 ft., Mississippian 3,389 ft., Kinderhook 3,605 ft., Misener 3,748 ft., Hunton 3,752 ft., Sylvan 3,790 ft., Viola 3,864 ft., Simpson sand 3,902 ft.

Rooks County: V. D. Sidey 2 Matheson, SE SE SE 13-10s-16w, dry, TD 3,575 ft., anhydrite 1,077 ft., Topeka 2,833 ft., Heebner 3,066 ft., Toronto 3,087 ft., Lansing-Kansas City 3,113 ft., Sooy 3,455 ft., Arbuckle 3,557 ft.

Sumner County: Marworth 1 Spitler, NW NW SW 2-33s-1e, dry, TD 4,143 ft., Stalnaker 2,559 ft., Kansas City 2,954 ft., Mississippi lime 3,521 ft., Simpson 4,012 ft., Arbuckle 4,093 (?) ft.

### SOUTH CENTRAL NEBRASKA WILDCAT FAILURES

Harlan County: Alpine 1 McCleery, SW SW NW 30-1n-18w, dry, TD 3,499 ft., Heebner 3,294 ft., Lansing-Kansas City 3,315 ft.

Alpine 1 Bantam, SW SW SW 15-1n-19w, dry, TD 3,722 ft., Heebner 3,433 ft., Lansing-Kansas City 3,462 ft.

# Southwest Texas

## Starr County Wildcat Flows Oil on Short Test

CORPUS CHRISTI.—A new discovery was indicated in Starr County at Sun Oil Co. 10 A. C. Jones, wildcat test 2 miles southeast of Jones gas field. On drill-stem test run from 4,597-603 ft., using ¼-in. chokes, with the tool open 12 minutes, the well started flowing pipe-line oil after the tool was closed. Tester is being pulled to determine full details of recovery. Another drill-stem test was run previously at 4,507-19 ft., with recovery being salt water. It is reported that operator will core ahead. The prospective discovery is located in Agua Nueva de Abajo Grant in CCSD&-RGNG RR Survey 275.

Atlantic Refining Co. 1 Jan S. Womack, gas and condensate discovery in Nueces County, is still testing. Through perforations at 8,975-86 ft., the well flowed 588,000 cu. ft. of gas per day plus 25 bbl. of condensate on a 14-hour test. Test was made using ¼-in. choke. It is at total depth of 9,997 ft. with 7-in. pipe set at 8,780 ft. and a 5-in. liner to 9,500 ft. The new producer is located in Cuadrilla Irrigation Co. Survey, Abstract 465, 4 miles east of Clara Driscoll field.

R. H. Hedge and J. C. Wynn 1 H. M. Roark, wildcat test 2 miles southeast of Green Franklin field, McMullen County, is reported at contract depth of 6,500 ft. Operator is preparing to run final log on the well which appears to be a dry hole. Test is located in James B. Taylor Survey 62, Abstract 632.

Southeast of Kingsville, Kleberg County, about 2½ miles, Curtis Singleton Drilling Co. 1 J. O. Johnson, wildcat, has set 5½-in. production string for completion attempt. Hole is bottomed at 7,712 ft. A gas sand was reported topped just above the total depth, but was not tested prior to setting the casing string. Only electrical log was run to bottom. Drill-stem tests in the well indicated gas-condensate production at 7,435-47 ft. and also at 7,447-52 ft. Oil production was indicated at 7,633-38 ft., where 3,100 ft. of pipe line oil were recovered on drill-stem test.

At its west extension well to South Campana field, McMullen County, Sunray Oil Corp. is preparing to perforate 1 Murphy for completion attempt. Casing was cemented on bottom at 3,065 ft. after drill-stem test of the Pettus sand recovered pipe-line oil. The well cored at 3,035-65 ft. recovering sand with oil odor in the last 4 ft. Drill-stem test at 3,361-65 ft. recovered 500 ft. of pipe-line oil. Bottom-hole pressure was 380 psi.

### SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Williamson County: New oil discovery—H. J. Stewart 1 Anna Rieger, Peter Cartwright Sur., 8 mi. SE of Taylor, TD 960 ft., Serpentine open hole 944-60 ft. and 942-44 ft., IP: 7 bbl. oil per day on pump, 38° gravity.

### SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Milam County: R. B. Paxson et al, 1 Ike Camp, Daniel Robinson Sur., ¾ mi. E of San Gabriel, dry, TD 1,980 ft.

San Patricio County: Quintana Petroleum Corp. 1 Kathleen Young Moore, James Orick Heirs Sur., A-209, dry, TD 9,750 ft.

Webb County: Clardy & Barnett A-1 Armstrong & Strohman, Los Animas Grant, 8 mi. W of Hebronville, dry, TD 2,509 ft.

Zapata County: Charles E. Long, Sr., 2 Mrs. Noyes Smith et al, Sec. 1, Harvey Subd., of Javali Grant, 13 mi. SW of Guerra, dry, TD 1,755 ft.

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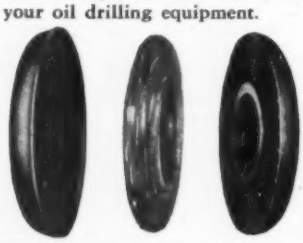

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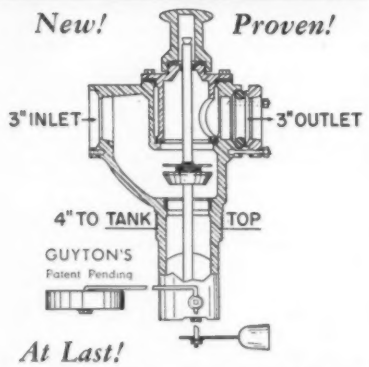


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# North Central Texas

## Flowing Mississippian Well for Archer County

WICHITA FALLS.—British-American Oil Producing Co. 1 W. O. Hayter, wildcat southeast of Megargel in Archer County, was showing for a good, flowing Mississippian discovery. After washing the hole with 500 gal. of acid, the well kicked off and flowed 199 bbl. of oil in 24 hours, and continued testing. Top of the Mississippian was 5,019 ft. It was drilled to 5,207 ft., plugged back to 5,040 ft., and casing set at 5,020 ft. for open-hole completion. Location is 3 miles north and 4 miles southwest of nearest Mississippian production.

The Texas Co. 1 D. Sewell, in the West Minor Bend conglomerate area of Montague County, was showing for a producer and west extension to the field. A 2-hour drill-stem test from 6,262-71 ft. had gas in 1 hour and recovered gas-cut mud, 600 ft. of oil-cut mud and 600 ft. of clean oil. It also recovered 3,200 ft. of salt water.

Stanolind Oil & Gas Co. 1 Mable Wilson, southeast extension try to North Knox City field, had top of the Caddo lime at 5,580 ft. and was drilling below 5,593 ft. The test missed the field's regular pay in the Palo Pinto and is to drill to the Ellenburger.

Stanolind's 1 Edwards, east of Rotan in Fisher County, recovered 1,250 ft. of sulfur water-cut mud and 2,475 ft. of sulfur water on a 1-hour drill-stem test from 6,538-6,600 ft., in the Ellenburger. Operators were conditioning hole to run electrical surveys.

The Texas Co. 1 E. L. Stewart has confirmed Strawn production as a west offset to W. T. Waggoner estate 1 Paine-McGaw. The 1 Stewart completed for a daily potential of 80 bbl. of 42°-gravity oil from perforations at 4,643-75 ft.

In the Lone Prairie Bend conglomerate field of northwestern Montague County, Wabash Oil Co. 1-A Mitchell completed for a daily potential of 420 bbl. of 41°-gravity oil. Operators said the pay zone, from 5,878-85 ft. was 100 ft. higher, and from a different section, than nearest producers.

**NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS**

Archer County: Taylor Drilling Co. 4 A. Coffelt, Wm. Baker & John Harris Sur., 5 mi. SW Archer City, TD 1,219 ft., pay 1,126 ft., IP pumped 75 bbl. 40°-gravity oil a day.

Coleman County: J. R. Dockery 1 G. T. Parrock, 18-4-H&TC, TD 1,980 ft., perf. 1,666-68 ft., IP flowed 2 bbl. oil a day, open 2-in. tubing, GOR 450 cu. ft.

Cooke County: Wilson Bros. Oil Co. 1 W. F. Solomon-West Ranch, Blk. 5, SPRR, 7 mi. NW Muenster, TD 2,388 ft., pay 2,382 ft., IP pumped 84 bbl. oil a day.

Fisher County: Intex Oil Co. 1 Gerald, 174-2-H&TC, 4 mi. E Rotan, TD 6,478 ft., elev. 1,914 ft., perf. 3,429-34 ft., IP pumped 65 bbl. 38°-gravity oil a day.

Texas Pacific Coal & Oil Co. 1-A R. J. Robertson, 185-BBB&C, 3 mi. NW Hamlin, TD 6,235 ft., elev. 1,771 ft., PB 3,740 ft., perf. 3,691-94 ft., IP pumped 47 bbl. 43°-gravity oil a day, GOR 451 cu. ft.

Wise County: T. G. Shaw 1 Frank Menn, B. F. Hines Sur., 5 mi. SW Cottondale, TD 4,418 ft., pay 3,157 ft., IP pumped 25 bbl. 42°-gravity oil a day.

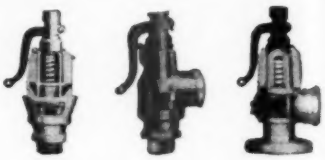
Hayden Farmer & S. W. Sparks 1 S. R. Jeffrey, TE&L Sur., 3 mi. SW Orth, TD 687 ft., pay 683 ft., IP pumped 18 bbl. 41°-gravity oil a day.

Young County: Greenbrier Oil Co. 1 G. O. Hazelton, Brazos River Indian Reservation Sur., 2½ mi. SE Graham, TD 4,583 ft., pay 3,140 ft., IP pumped 36 bbl. 41°-gravity oil a day.

E. H. Remington 1-A C. J. Taack, TE&L Sur., 6 mi. N Newcastle, TD 690 ft., pay 687 ft., IP pumped 10 bbl. oil a day.

**NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES**

Archer County: Chas. E. Morrison 1 Wil-

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WICHITA FALLS, TEXAS

son "J," ATNC Sur., 12 mi. NE Archer City, dry, TD 4,533 ft., sand with oil show 3,868-89 ft.

Baylor County: Helmerich & Payne 1 C. B. Dunn, TE&L Sur., 1 mi. S Westover, dry, TD 5,455 ft., Caddo around 5,116 ft.

Callahan County: G. E. Kadane & Sons 1 Hennessy & Windham, 87-13-T&P, 7 mi. N Clyde, dry, TD 4,972 ft., elev. 1,935 ft., Tannehill 1,255 ft., Cook 1,750 ft., Caddo 4,404 ft., Mississippian 4,882 ft., Ellenburger 4,925 ft.

P. P. Langford 1 M. D. Watson, Sec. 51, BBB&C Sur., dry, TD 1,870 ft., elev. 2,037 ft., Saddle Creek 1,656 ft., Cook 1,790 ft.

Coleman County: Boone & Martin 1 W. S. See, Blk. 11, Coleman CSL, ½ mi. SW Rockwood, dry, TD 1,530 ft., Caddo 1,510 ft.

Woodley Petroleum Co. 1 J. W. Saunders, J. P. McClean Sur., 2 mi. W Rock Crusher, dry, TD 3,291 ft., Gardner 3,158 ft.

Cooke County: M. H. Goss 1 C. L. Links, A. C. C. Bailey Sur., 4 mi. E Gainesville, dry, TD 2,185 ft.

Knox County: T. D. Humphrey et al 1 Mary A. Bush, E. Boren Sur., 7 mi. NW O'Brien, dry, TD 6,038 ft.

Montague County: Jones, McFarland & O'Connell 1 G. E. Blackmon, TE&L Sur., 6 mi. NW Bowie, dry, TD 6,196 ft., elev. 997 ft., Caddo 6,039 ft.

Parker County: Burdell Oil Co. 1 A. R. Cardwell, T. Hamilton Sur., 15 mi. SE Weatherford, dry, TD 2,393 ft.

Shackelford County: Tom Harrigan 1 Danewood, 90-13-T&P, 5 mi. SE Hamby, dry, TD 1,688 ft.

Stephens County: Hooker & DeMohrenschildt 1 Mrs. Bernie McCrea, Sec. 371, SPRR Sur., 11 mi. N Cisco, dry, TD 4,205 ft., elev. 1,512 ft., Caddo 3,446 ft., Mississippian 4,096 ft., Ellenburger 4,201 ft.

Chester Imes & E. C. Johnston 1 L. C. Link, 68-4-T&P, dry, TD 1,794 ft.

Stonewall County: Seaboard Oil Co. 1 Ollie Sparks, 317-2-H&TC, 14 mi. SW Aspermont, dry, TD 6,458 ft., elev. 1,901 ft., Caddo 6,291 ft., Mississippian 6,405 ft.

Wichita County: The Bolin Trust 1 J. & J. Waggoner "B," 21-7-H&TC, 5 mi. NW Kamay, dry, TD 2,205 ft.

F. J. Pounds 1 Pounds-Waggoner, 55-4-H&TC, 10 mi. S Oklaunion, dry, TD 2,155 ft.

Wilbarger County: Craig & Neal 1 W. T. Waggoner, 15-4-H&TC, 5 mi. SE Grayback, dry, TD 2,503 ft. in shale.

Clark Neal 1 W. T. Waggoner, 37-4-H&TC, 7 mi. SW Harrold, dry, TD 1,960 ft.

Wise County: Ray C. Fish 1 Mary E. Owens, Wm.Tryndale Sur., 2 mi. W Padgitt, dry, TD 4,897 ft., elev. 1,185 ft., Caddo 4,387 ft., Mississippian 4,808 ft.

Young County: Reno Oil Co. 1-D Graham Stewart, Young CSL Sur., 1½ mi. S Markley, dry, TD 5,665 ft.

## Michigan

### Flowing Well Spurs Work In New North Fork Field

MOUNT PLEASANT.—Renewed interest was being focused on North Fork field, Orient Township, Osceola County, a 1950 discovery, this week as flowing production was encountered in a top Dundee pay at I. W. Hartman 1 Cushman, NW SE SE 33-17n-7w. This new well, a diagonal southwest 20-acre offset to the field discovery well, logged Dundee top at 3,781 ft. and oil pay showed to 3,783-84 ft. Both the top of the objective zone and the pay horizon checked in about 6 ft. higher than any other test yet drilled in the pool. The well flowed an average of 17 bbl. of oil every 2 hours, by heads, the first day after pay was tapped, and on a 14-hour test, tank gages showed that 100 bbl. of oil had been run to storage. Drilling operations were


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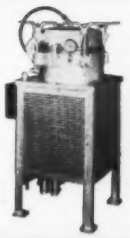

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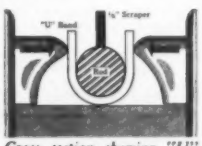
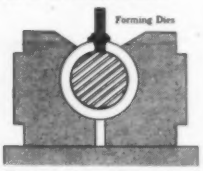


*Cross section showing "U" band being die-formed around rod to the scraper blades.*



*Cross section showing band held under pressure around rod while ends of band are shrink-grip attached to scraper blade. Neither Scrapers nor Bands are welded to the sucker rod.*

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temporary suspended at 3,784 ft. but operator planned to deepen to about 3,787 ft., to a minus point equal with the discovery producer, in hopes of logging a second pay zone.

The 1 Cushman is the first well in the North Fork development to flow natural from the Dundee. Besides the pool opener, there is one other small producer (a structurally low, diagonal northwest offset to the discovery), and two dry holes in the field.

A long string of 5-in. casing was run and cemented at Michigan Oil Co. 1 State-Jerome, NW SW NE 13-15n-1w, Dundee oil-showing wildcat in Jerome Township, Midland County. The hole was deepened from 3,766 ft. to 3,793 ft. Dundee top was logged at 3,693 ft. and first oil pay, showing 100 ft. of free oil in 2 hours, was logged from 3,755-58 ft. After it had been bailed down and shut in for 16 hours at 3,793 ft., the well showed 500 ft. of free oil.

### MICHIGAN WILDCAT FAILURES

Bay County, Williams Township: C. W. Collin 1 Duel, SW NE NE 19-14n-3e, Dundee 3,622 ft., dry, TD 4,000 ft.

Clinton County, Dallas Township: Thomas B. Mask 1 Rademacher, NW NW SW 21-7n-4w, Traverse 2,471 ft., dry, TD 2,518 ft.

Lake County, Elk Township: W. Spencer Cook, Inc. 1 Edgcomb, NW NW NE 14-20n-14w, Traverse 1,923 ft., dry, TD 1,927 ft.

Muskegon County, Casnovia Township: Rex Oil & Gas Co. and Fisher-McCall Oil & Gas Co., Inc. 1 Johnson, NE SW SW 23-10n-13w, Berea 1,531 ft., dry, TD 1,546 ft.

## Eastern Texas

### Active Sandusky Area Has Successes and Failures

DALLAS.—Sinclair Oil & Gas Co.'s 1 Jewell, Grayson County wildcat southwest of the Sandusky area, and an old well being redrilled, recovered 325 ft. of oil and gas-cut mud, plus 25 ft. of black oil on a drill-stem test of the Ellenburger at 7,925-67 ft. Length of the test was 1 hour and bottom-hole flowing pressure was 1,420 psi.

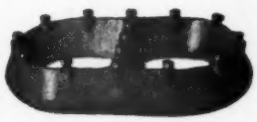
The Texas Co. 1 Scarborough, Stickney Survey, was drilling below 6,964 ft. in shale and lime. Mid-Continent Petroleum Corp. and Skelly Oil Co. 1-D Chiles Estate, 2½ miles northwest of Pottsboro, was below 4,522 ft. in shale. One mile east of Sandusky, Olson Drilling Co. 1 Little logged top of the Oil Creek at 7,172 ft. A 45-minute drill-stem test from 7,168-75 ft. had gas in 3 minutes, mud in 26 minutes, and flowing oil in 28 minutes. The test had not been completed at last report.

Failures in the Sandusky area included L. O. McMillan 3 Chambers, Fisher Survey, which topped the Oil Creek sand at 7,236 ft. and was dry at 7,239 ft. Drill-stem test of the 3-ft. sand section recovered salt water with no shows of oil. Pure Oil Co.'s 1 Rich was completed dry at 8,280 ft.

New location was made by McMillan for his 1 O. B. Rich, Armstrong County, 1,650 ft. east of Pure's failure and 2,200 ft. northwest of a 7,495-ft. dry hole which separates it from Oil Creek production to the east and southeast. Location is on a farmout from Pure, which included a 160-acre tract to the south in the G. L. Scott Survey. Pure was said to have retained an override on both tracts. McMillan's 1 Rich is to drill to 8,000 ft.

In Rains County, southeast of Emory, R. J. Caraway's 1 Puckett was coring ahead below 11,980 ft., looking for top of the Smackover limestone. Core recovery at 11,923-971 ft. was limestone, shale, and sand with sulfur odor.

In Anderson County, Big Chief Drilling Co. 1 Hughes, Tennessee Colony outpost, was drilling shale at 5,357 ft. Continental



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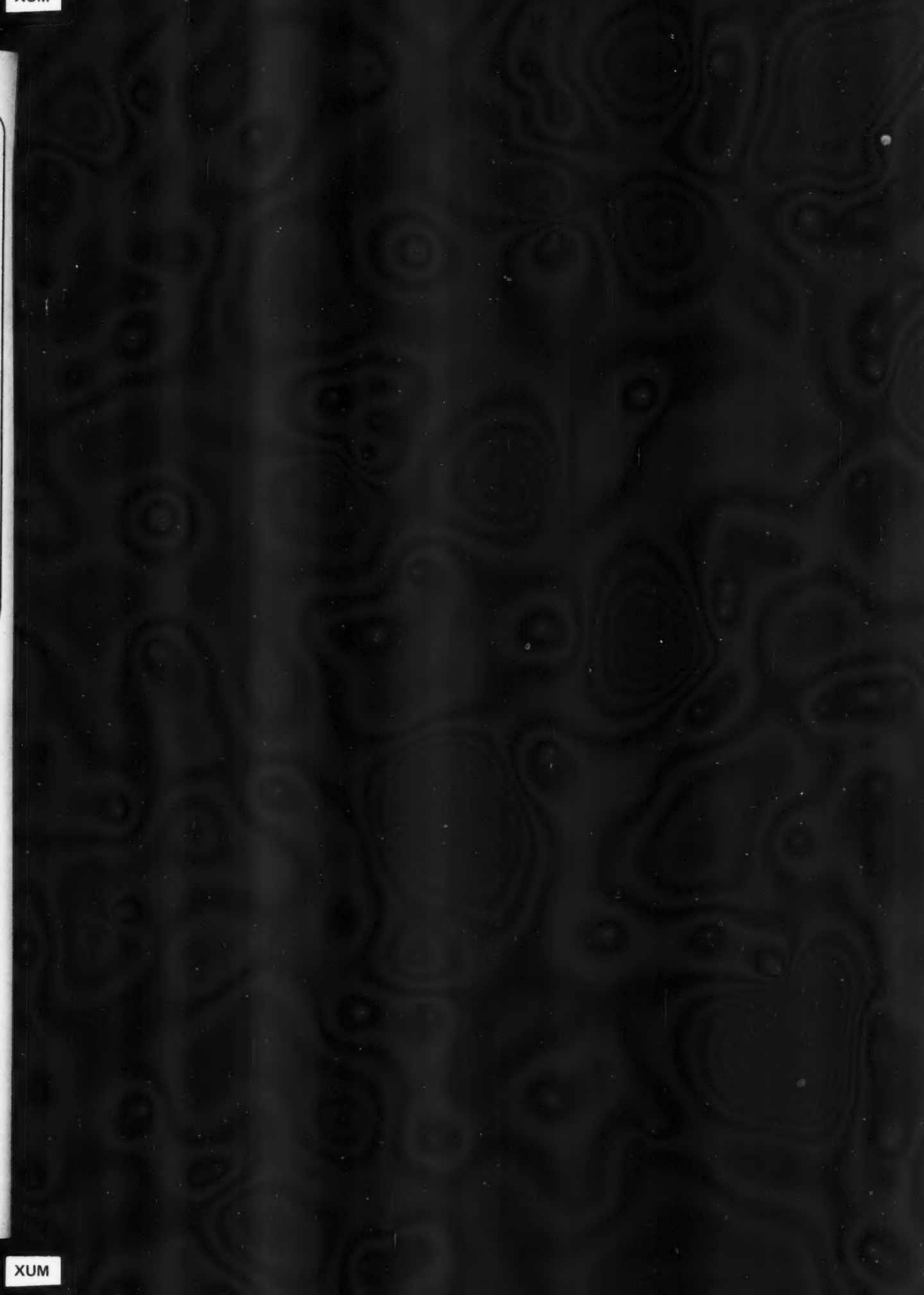
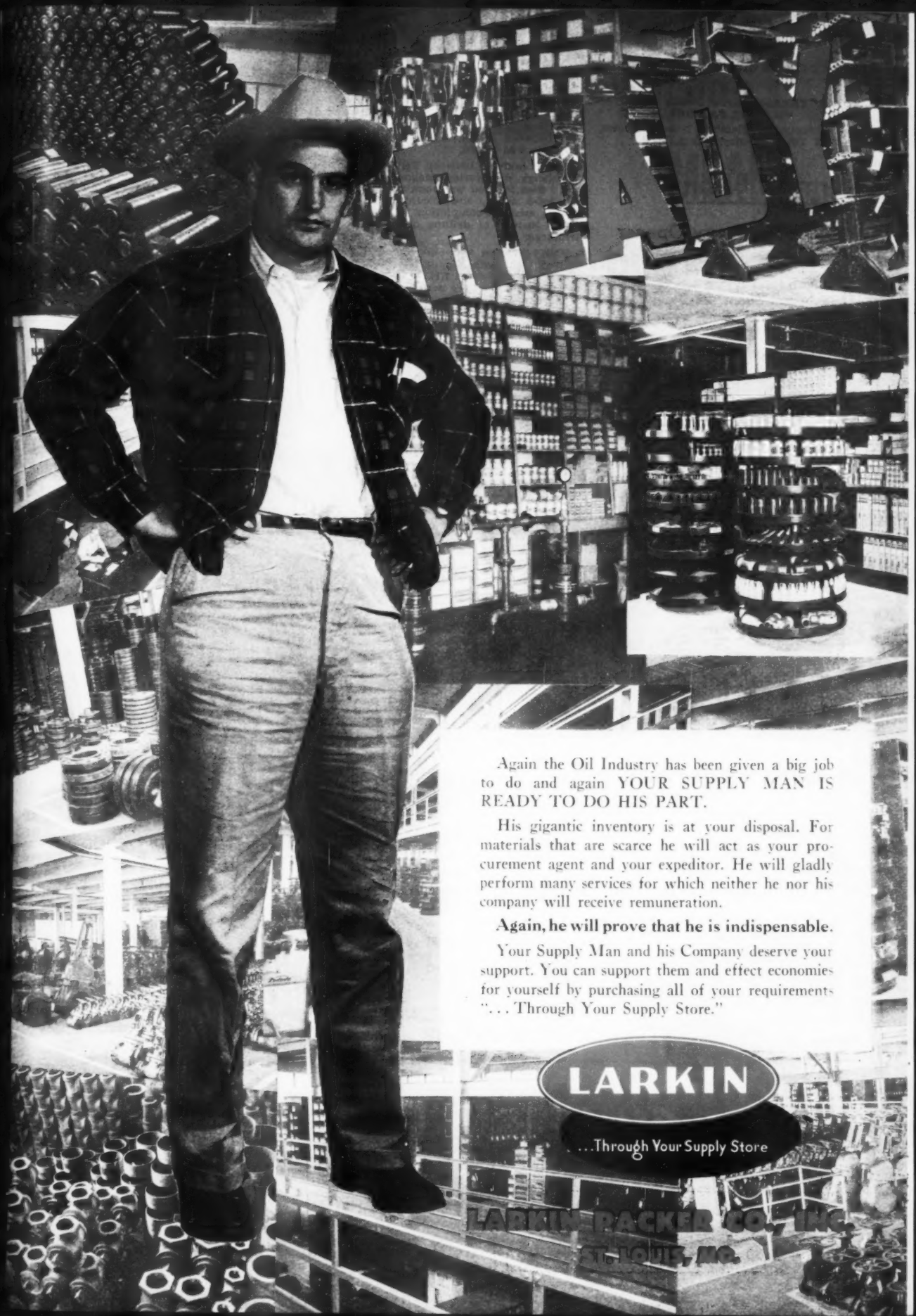


XUM

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Oil Co. 1 Carroll, wildcat south of Tennessee Colony, was drilling shale at 8,768 ft.

**EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURE**

Falls County: E. Fletcher 1 A. B. Davis, Lott Townsite, dry, TD 1,370 ft.

# Permian Basin

## Another Spraberry Opener For Midland County Area

MIDLAND.—Ted Weiner and others completed their second Spraberry discovery in the southeast Midland County area. The new well, 1-17 Braden, lies across the county line and in the extreme northeast corner of Upton County. It is about 8½ miles southeast of the same operators' discovery of Driver field, also in the Spraberry sand. Completion potential on the new strike was 452 bbl. of 38°-gravity oil a day, flowing through open 2-in. tubing from pay between 7,000-7,180 ft., total depth. Gas-oil ratio was 535 cu. ft.

About midway between Ted Weiner's two Spraberry discoveries, Magnolia Petroleum Co. 1 Sam Preston was running pipe to 7,244 ft., total depth, and according to reports would attempt completion from the Spraberry instead of drilling ahead to the Ellenburger.

The 1 Preston was checking high to the Driver well, with top of the Spraberry at 7,113 ft. A core from 7,113-7,204 ft. indicated 93 ft. of possible pay zone.

Humble Oil & Refining Co. 1 Tippett, deep test southwest of the 1 Braden, prepared to drill-stem test to 11,715 ft. in unidentified limestone.


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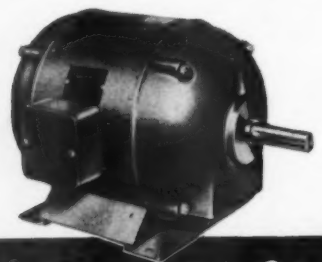

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G. H. Vaughn Production Co. 1 W. C. Campbell, Midland County wildcat, reported top of the Spraberry at 7,780 ft., on elevation of 2,788 ft. Operators started coring at 7,800 ft. and had good fluorescence to 7,824 ft. Top of the sand was said to be high on the same section in Ralph Lowe 1 Hill, recent Dean sand discovery to the southwest.

In Runnels County, Humble had a prospective discovery from the Goens limestone of the lower Strawn at its 1 Roy Tyree. The well had flowed oil estimated at 35 bbl. hourly on a drill-stem test at 4,206-18 ft., then after perforating casing from 4,206-14 ft. the well kicked off after the swab had been run eight trips. It flowed into pits to clean and was making oil with some salt water. Flowing pressure was 50 psi. on tubing and 325 psi. on casing. Later it gaged 106.38 bbl. of oil and 143 bbl. of water in 23½ hours, and died. The flow was through 22/64-in. choke. Operators believed the water was from a strata lower than the Goens and were to set a retainer slightly below 4,214 ft. and perforate at 4,222-24 ft.

In Kent County, Star Oil Co. 1-B Blanch Young, south offset to the North Polar Ellenburger discovery, developed 200 ft. of salt water and 200 ft. of heavily oil and gas-cut mud on a 2½-hour drill-stem test in the Ellenburger from 7,792-7,821 ft. It was drilled ahead to 7,850 ft. for a second test.

Wilshire Oil Co. 1 Whatley, northwest Scurry County wildcat, had 375 ft. of heavily gas-cut mud on a drill-stem test of the Ellenburger at 8,398-8,496 ft. It was to drill ahead and test at 50-ft. intervals.

Honolulu Oil Co. and Signal Oil Co. 3 M. D. Underwood, probable sixth producer and ½-mile southwest extension of Ropes field in Hockley County, recovered 2,880 ft. of oil with no water on an 8½-hour drill-stem test in the Pennsylvanian reef at 9,298-9,330 ft. Tentative top of the lime was 9,300 ft., on elevation of 3,376 ft. Honolulu's 2 Burleson, Ropes field test, had apparently missed the reef pay and was to drill ahead to the Strawn. At last report it was drilling below 9,690 ft.

In southeastern Upton County, Cities Service Oil Co. and Continental Oil Co. 1-AH University gaged a total of 315.5 bbl. of oil and 48 bbl. of water on a 22½-hour test on perforations at 10,765-775 ft., then squeezed the perforations and was waiting on cement. The test was through several sizes of chokes. During the last hour of the test period the gage was 2.4 bbl. of oil and 10.3 bbl. of water, through 19/64-in. choke.

C. W. Murchison 1 Joe Cannon, northwest extension to Pegasus field, had salt water in the Ellenburger at last report. Earlier reports indicated the well had completed from both the Ellenburger and the Pennsylvanian. It developed a flow of 16 bbl. of oil hourly from the Pennsylvanian and 360 bbl. in 26 hours from the Ellenburger. Perforations in the lower formation have been squeezed at 13,105-160 ft.

**WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS**

Concho County: Jack D. Collins 1 Walter Pfluger, A. Sator Sur. 2,088, 6 mi. SW Eden, TD 2,141 ft., perf. 2,121-24 ft. in Canyon sand, IP pumped 102 bbl. 34°-gravity oil a day.

Midland County, Driver field discovery: Ted Weiner 1-16 J. W. Driver, 16-37-4S-T&P, 24 mi. SE Midland, TD 7,325 ft., elev. 2,721 ft., Spraberry 7,110 ft., IP flowed 303.6 bbl. 37°-gravity oil a day, 8/16-in. choke, GOR 615 cu. ft., TP 75 psi.

Runnels County: Frank Love & Co. 1 Joe Willeke, 1-1-Wm. Wilson Sur., 12 mi. SE Ballinger, TD 1,955 ft., elev. 1,747 ft., Serratt sand 1,925 ft., IP pumped 120 bbl. 42°-gravity oil a day.

Schleicher County: Westbrook Oil Corp. 1-A A. L. Baugh, 8-M-GH&SA, 6 mi. NE Eldorado, TD 5,790 ft., perf. Strawn 5,728-58 ft., IP pumped 14 bbl. 69°-gravity oil a day.

**WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES**

Andrews County: Anderson-Prichard Oil

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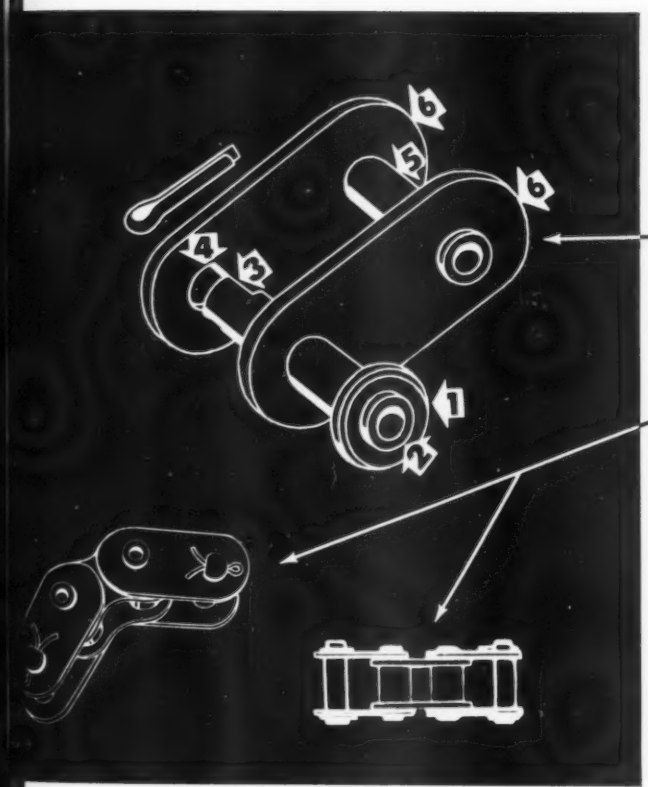
# BALDWIN-REX "BA" ASSEMBLY MEANS . . .

# EASY REPAIR . . .

# EASY ADJUSTMENT

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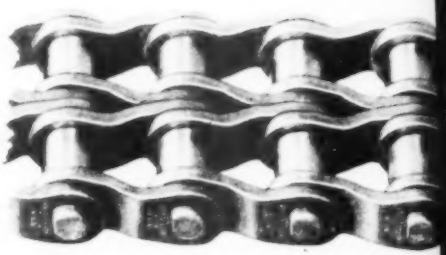

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Corp. 1 Fasken G-45, 45-41-1N-G&MMB-&A, 17 mi. SE Andrews, dry, TD 4,815 ft.

Borden County: Geler Jackson, Inc. 1-A Morgan Coates, 12-27-H&TC, 15 mi. S Gail, dry, TD 8,185 ft., elev. 2,437 ft., Spraberry 5,148 ft., Dean 5,418 ft., reef 7,505 ft., Strawn 8,050 ft.

Crosby County: National Associated Petroleum Co. 1 L. M. Abel, 9-3-WCRR, 9 mi. SW Crosbyton, dry, TD 9,290 ft., elev. 3,032 ft., Clear Fork 3,770 ft., Strawn 8,261 ft., Bend 8,585 ft., Ellenburger 9,160 ft.

Dickens County: Placid Oil Co. 1 S. M. Swenson Unit 1, 226-1-H&GN, 1 mi. SE Spur, dry, TD 7,796 ft., elev. 2,250 ft., reef 6,723 ft., Mississippian 7,337 ft., granite wash 7,737 ft.

Garza County: C. T. McLaughlin 1 Williams, 72-5-H&GN, 10 mi. NW Justiceburg, dry, TD 7,835 ft., Wolfcamp 5,070 ft., Cisco 5,710 ft., Strawn (?) 7,150 ft., Ellenburger 7,814 ft.

Martin County: Spartan Drilling Co. 1 Ida Walcott, Ward CSL, NW corner of county, dry, TD 12,678 ft., elev. 2,892 ft., Grayburg 4,359 ft., Spraberry 7,948 ft., Dean 9,286 ft., Wolfcamp 9,594 ft., Pennsylvanian 10,415 ft., Strawn 10,810 ft., Mississippian 11,503 ft., Woodford 11,822 ft., Devonian 11,920 ft., Montoya 12,420 ft., Ellenburger 12,570 ft.

Pecos County: Wilshire Oil Co. 1 Atlantic-Frame, 8-10-H&GN, dry, TD 9,870 ft., elev. 2,485 ft., San Andres 2,450 ft., Tubb 3,920 ft., Simpson 7,325 ft., Ellenburger 9,250 ft.

Runnels County: J. K. Dorrance 1 R. E. Coleman, 85-T&NO Sur., 3 edge Miles city limits, dry, TD 4,905 ft., elev. 1,805 ft., Gunsight 2,900 ft., Swastika 3,036 ft., Morris 4,060 ft., Strawn 4,240 ft., Caddo 4,778 ft., Ellenburger 4,900 ft.

Scurry County: Reef Oil Corp. 1 Carl Gray, 32-3-H&GN, 4 mi. W Hermleigh, dry, TD 7,664 ft., elev. 2,306 ft., San Andres 1,370 ft., Glorietta 2,050 ft., Clear Fork 2,180 ft., Strawn 7,108 ft., Ellenburger 7,595 ft.

Tom Green County: Mrs. C. C. Daniel 1 Ohio Weddell, 50-5-H&TC, 7 mi. SW Water Valley, dry, TD 1,458 ft.

### SOUTHEASTERN NEW MEXICO

HOBBS.—Amerada Petroleum Corp. 3-BTC State, Bagley field outpost, had flowing oil from the Pennsylvanian on a drill-stem test. The test which developed flowing oil was run from 9,050-85 ft., total depth. Gas surfaced in 8 minutes, mud in 20, and oil in 30 minutes. At the end of 4 hours it had gaged 185 bbl. of 47°-gravity oil, with gas-oil ratio of 479 cu. ft. A previous test at 8,892-9,050 ft. had a good blow of gas but did not flow. Recovery in 4 hours was 630 ft. of mud which was about half oil, plus 360 ft. of 60°-gravity distillate.

McAlester Fuel Co. 1-A Lula Simpson, 1½-mile southwest outpost to the new Gladiola field of Lea County, was shut down for orders after recovering 2,000 ft. of water blanket, drilling mud and some 7,000 ft. of salt water on a 4-hour test of the Devonian at 12,255-88 ft. Top of the formation was 12,244 ft. One source credited the mud with being very slightly cut with oil.

The Texas Co. 1 State, north of Saunders field, made a flow of 68 bbl. of 43°-gravity oil in 1 hour on a drill-stem test at 9,856-95 ft. When the tester was opened, the water blanket flowed in 50 minutes, gas and mud in 1 hour, and oil 4 minutes later. Gas-oil ratio was 1,800 cu. ft. Operators were waiting to take completion potential.

Tide Water Associated Oil Co. 1 State D, wildcat in northeast Lea County, was drilling in shale and limestone below 11,460 ft. A core from 11,150-80 ft. recovered 30 ft. of lime, some shale, with no porosity or shows.

### SOUTHEAST NEW MEXICO WILDCAT FAILURES

Chaves County: Franklin, Aston & Fair 1 Orchard Park, 22-12s-25e, dry, TD 5,828 ft., elev. 3,563 ft., San Andres 630 ft., Glorietta 1,460 ft., Yeso 3,748 ft., Abo 3,748 ft., Permo-Pennsylvanian 4,485 ft., pre-Cambrian 5,304 ft.

Eddy County: Collier & Bassett 1 Miller-State, 28-20s-28e, dry, TD 766 ft., elev. 3,230 ft., salt 390-530 ft., Yates 760 ft.

# Appalachian-Ohio

## Development Continues In Maryland Gas Area

PITTSBURGH. — In the Mountain Lake Park section, Garrett County, Maryland, two new locations have been made and operations have been started at a third well. Eberly & Snee 1 Floyd Artes and Delaware Gas Co. 1 Holloway (Lot) are the new ventures. Union Drilling Co. 1 Simon Cogley is currently below 50 ft. In the same section, George L. Yaste 1 Grimes, elevation 2,421 ft., topped the chert at 3,308 ft. with gas at 3,407 ft. Production was gaged at 35,000 cu. ft. The well found sand at 3,510 ft., and is shut down at 3,514 ft.

**Pennsylvania.**—In Leidy Township, Clinton County, one new location was announced: Mid-Atlantic Oil & Gas Co. 1 Theodore Daugherty, on the Tamarack Quadrangle. No completions were reported in this area.

**West Virginia.**—In Portland district, Preston County, Eberly & Snee 1 S. F. Calvert, elevation 2,180 ft., is drilling at 5,190 ft. with the Onondaga lime reported at this depth. Two good shallow sand gas wells were noted: Slab Fork district, Wyoming County, Ravencliffe Development Co. 29 Wyoming Pocahontas Coal & Coke Co., 1,784,000 cu. ft. of gas, total depth 2,412 ft.; Triadelphia district, Logan County, United Producing Co., Inc., 3-1731 Buffalo Creek Coal & Coke Co., 1,107,000 cu. ft. of gas, total depth 3,234 ft.


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### OHIO

COLUMBUS.—Kenneth Adair et al found an east extension to the old Gore field in Falls Gore Township, Hocking County. Their 1 John Sweazy, Section 36, logged Clinton sand at 3,204-35 ft. with a good showing of oil and 100,000 cu. ft. gas natural. The well will be shot before put on pump.

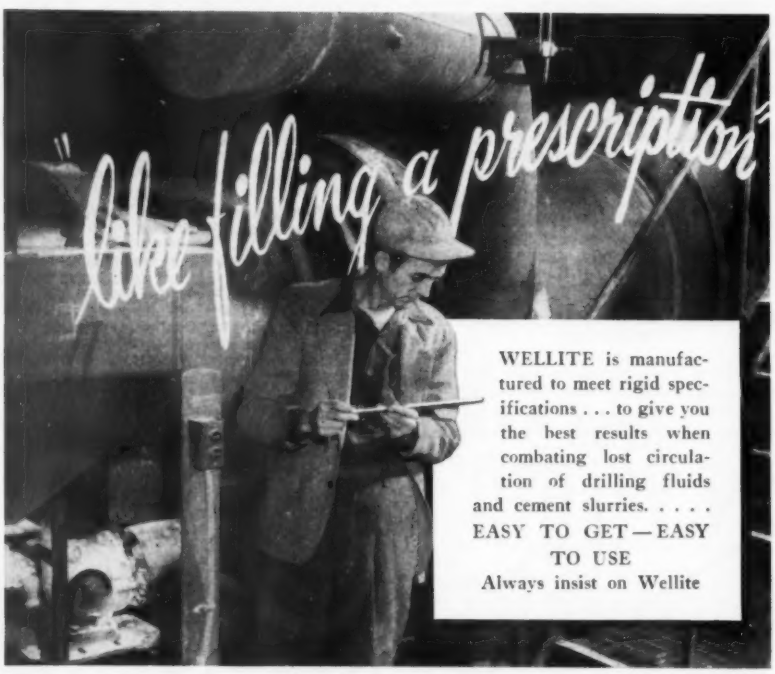
John Galey et al failed to find gas in their latest attempt to develop a gas field east of Ravenna. Their 1 F. R. Fageol, Lot 38, Ravenna Township, Portage County, 1½ miles north of the discovery found the white Clinton at 4,337-47 ft. with only a showing of gas. The hole was plugged.

Fairfield Drilling Co. 1 C. E. Johnson, Section 2, Reading Township, Perry County topped the Clinon at 3,031 ft. and ran into a fishing job at 3,042 ft. The sand already drilled has a nice showing of oil with 200,000 cu. ft. of gas.

Drilling in Ohio is still at a minumum due to weather and field conditions. Only 9 new locations were reported for the week, and only 13 wells were completed.

### OHIO SUCCESSFUL WILDCAT

Lorain County, Huntington Township: Ohio Fuel Gas Co. 1 G. C. Krueck, Lot 18, Clinton 2,583-87 ft., 310,000 cu. ft., TD 2,653 ft.

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## Rocky Mountain

### New Dakota Sand Discovery East of South Glenrock

DENVER.—Shell Oil Co. recovered 5,680 ft. of oil on 1-hour drill-stem test at another wildcat south of the town of Glenrock, Converse County, Wyoming, for an apparent new Dakota sand discovery. The well is 1 Government, SW NW SW 15-33n-75w, 1½ miles east of production in South Glenrock field. The well is considerably lower structurally than expected, and found Dakota at 7,070 ft. with the test between 7,090-7,131 ft. This well was a disappointment in the Muddy sand found at 6,917 ft. as the zone was shaled out. Both Muddy and Dakota sands are productive in Far West Oil Co., Ralph Lowe, and other wells through the South Glenrock area and the Dakota is approximately 800 ft. higher structurally in that area than at the new Shell location. The well is apparently on another of the series of stratigraphic traps along the south and west sides of the Powder River basin. During the past 2 years there have been seven new discoveries through this area of the state.

Initial tests indicate more than a 200-bbl. per day producer at the Stanolind Oil & Gas Co., Kerr-McGee Oil Industries, and Phillips Petroleum Co. discovery in the Meade area, Banner County, Nebraska. The well is 1 Downer, NE NE SE 6-18n-55w, and production is from the J (Lower Graneros) sand between 5,878-5,907 ft. The well is an important discovery 60 miles northwest of production in the current Julesburg basin play. Stanolind is now drilling on a second well in the area, 1½ miles south of the new discovery. Through the Colorado portion of the basin a series of new wildcats has been started, with the majority of these east of production. Ryan Oil Co., J. E. Manning, and Steelco Drilling Co. have each started wells through Yuma County. Following successful use of Hydrafrac treatment in other wells in the basin, British-American Oil Producing Co. this week went back in to rework 1 Segelke, NE NW NE 26-11n-53w, Logan County, Colorado. This was the first discovery in British-American's program and the first well to start activity in the Colorado portion of the basin. The well was a small producer on completion and was making considerable water. However, following Hydrafrac the well increased in production to 60 bbl. of oil daily on pump with no

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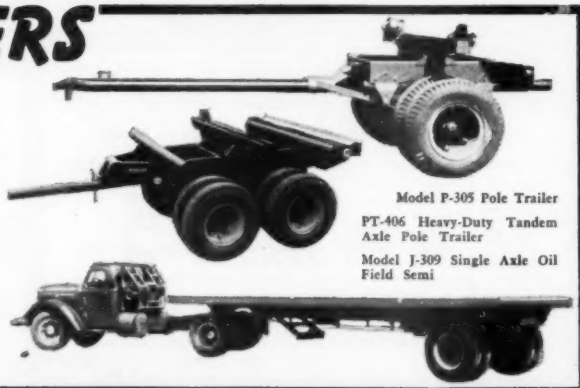

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water. The operator is now installing pump for further tests.

Another excellent producer is indicated in the Slick Creek area, Washakie County, Wyoming, with the near-completion of General Petroleum Corp. 44-34-G, SE SE NW 34-47n-92w. This well is the second in this field and is an extension 1½ miles east of the discovery well. The well is at 10,553 ft., total depth, in the Embar and cores in that formation indicate an excellent producer. Casing is cemented at 10,395 ft. and the operator is now waiting on cement.

**COLORADO WILDCAT FAILURE**

Eckley area, Yuma County: Ohio Oil Co. 1 Brophy, SE SE SW 31-4n-46w, TD 6,380 ft., dry, Niobrara 2,580 ft., Hays 2,980 ft., upper Benton 3,058 ft., Greenhorn 3,214 ft., lower Benton 3,246 ft., top first sand 3,412 ft., base third sand 3,664 ft., Cloverly 3,740 ft., Morrison 3,946 ft.

**NEVADA WILDCAT FAILURE**

Elko area, Elko County: McCarthy Gas & Oil Co. 1 Rahas, 9-35n-58e, TD 4,125 ft., suspended indefinitely.

**WESTERN NEBRASKA WILDCAT FAILURE**

Agate area, Sioux County: Dennison et al., 1 fee, C NE NE 22-27n-55w, TD 4,905 ft., suspended for winter.

# Illinois-Ind.-Ky.

## Clinton County Wildcat Has Silurian Saturation

A SATURATED dolomitic zone identified as being of Silurian age has been encountered by E. J. Goldschmidt and H. F. Robison in their 1 Jaske Community, NE NE SE 1-2n-4w, an extension test for the new Devonian producing area opened by Gulf Refining Co. 6 miles northwest of Carlyle, Clinton County, Illinois.

Top of the Silurian was given as 2,264 ft. Saturation was carried in an 8-ft. core recovery at 2,272-80 ft. A 30-minute drill-stem test, taking in an interval from 2,259 ft. to the bottom of the cored depth, had gas at the surface within 5 minutes and yielded 380 ft. of clean oil with 120 ft. of oil-cut mud in the pipe breakdown. Casing has been run to 2,251 ft. for production tests.

The well is about ¾ mile southwest of the discovery well, Gulf Refining Co. 1 Warnecke, NE NE NW 6-2n-3w, now being completed in the Devonian at 2,171-2,217 ft. On production tests it flowed at rates up to 76 bbl. of oil and 6,000,000 cu. ft. of gas per day. It also had good saturation in McClosky lime at 1,194-1,211 ft.

Ryan Oil Co. 3 Morrill, SW NW SW 11-6s-9e, located on the west side of production at the north end of the Storms pool, White County, Illinois, is showing prospects of opening first McClosky production for the area. Nearest McClosky production is 3 miles distant. Total depth is 3,087 ft. with saturation logged at 3,078-83 ft. Approximately 390 ft. of clean oil and 120 ft. of mud-cut oil was recovered in a drill-stem test of the zone. The well started gassing within 13 minutes after the tester was opened. There was no evidence of water. Indicated bottom-hole pressure was 850 psi. Operators have run oil string to 3,072 ft. for completion. The area is 5 miles south of Carmi.

Joe Bander and W. W. Toler 2 Diesser, NE NE NW 1-3n-9e, 3 miles west of Olney, Richland County, Illinois, and a mile east of production of the Clay City-Noble Consolidated pool, swabbed 5 bbl. of oil per hour while cleaning out to test good saturation found in the Rosiclare zone. Total depth is 3,029 ft. with casing perforated at 2,976-82 ft., 2,986-90 ft., and 2,994-97 ft.

Testing of J. W. Rudy 1 Denny-Bunting, NW SE NW 32-1n-9e, 2 miles east of Clay City-Noble production in the area 2½ miles south of Mt. Erie, Wayne County, Illinois, is being delayed by a fishing job to recover cable tools. While fishing, however, it flowed by heads, making an estimated 20 bbl. of oil in 45 minutes. Pay zone is the Aux Vases, logged at 3,219-29 ft.

J. B. Buchman and C. E. O'Neal, SE SE SE 24-P-26, which is opening a new producing zone, the O'Hara lime, for the Hebbardsville area in southeastern Henderson County, Kentucky, started swabbing at the rate of 7 bbl. per hour but production quickly dropped to about 1½ bbl. per hour. The zone had been treated with 1,000 gal. of acid prior to start of swabbing, but an additional 2,000 gal. is being injected for further testing. Casing is perforated at 2,213-17 ft. Total depth is 2,305 ft. with bottom of the casing string at 2,271 ft. No water appeared in the initial tests. The well is about ¾ mile southwest of Hebbardsville production, most of which is from Tar Springs sand.

Production of the Buford pool in Ohio County, Kentucky, has been extended southwestward with a 15-bbl. pumper completed by H. C. Farmer and associates at their 1 Bell, C S½ NW NW SE 11-M-30. Production is from Jackson sand at 994-1,010 ft.

**ILLINOIS WILDCAT FAILURES**

Clark County: C. O. Robinson 1 Hammond, SW SE SW 6-11n-13w, dry, TD 466 ft.

Edwards County: J. M. Hall 1 Hallem, SW SW SW 32-2s-10e, dry, TD 3,372 ft.

Hamilton County: C. E. Brehm 1 Mitchell, SW SE SW 14-5s-7e, dry, TD 3,376 ft.

Montgomery County: Carl Jensen 1 Gerdes, NW SE NE 7-7n-5w, dry, TD 650 ft.

**INDIANA WILDCAT FAILURES**

Daviess County: Ralph Lawyer 1 Heithecker, NE NW NE 14-4n-7w, dry, TD 1,018 ft.

Knox County: Edward Kavanaugh 1 Reel, SE SE NW Projected Section 6-2n-8w (Militia Donation 59), dry, TD 1,500 ft.

Martin County: Thomas R. Duke 1 Brooks, NE NW NW NW 30-3n-4w, dry, TD 605 ft.

Posey County: Calvert Drilling Co. 1 Menkeheim, NE NE SW 21-5s-12w, dry, TD 2,823 ft.

**WESTERN KENTUCKY SUCCESSFUL WILDCAT**

Ohio County: H. C. Farmer et al 1 Bell, C S½ NE NW SE 11-M-30, IP 15 bbl., Jackson 994-1,010 ft., TD 1,023 ft. (Extension Buford pool).

**EASTERN KENTUCKY**

ASHLAND.—In Isonville pool of eastern Elliott County, located on the waters of Newcombe Creek, Sandy Hook Drilling Co. has completed 1 Vess Peters for 3 bbl. of oil daily from the Weir sand at total depth of 1,025 ft. In the same pool, Long and Arnett 2 D. N. Oliver is showing for a producer from the Weir sand at total depth of 1,152 ft. Well will be shot for completion.

In Greenup County, 3-Y-79, Dixie King Oil & Gas Co. will reshoot 1 Wain Boggs. This wildcat test is bottomed at 610 ft. in Devonian black shale. Operators have previously tested Berea sand topped at 459 ft. Hole is showing some oil which operators hope to increase with new shot.

# Louisiana-Arkansas

## Lucky Field Gets Good Gas Well

SHREVEPORT.—Placid Oil Co. brought in a good well in Lucky gas field, Bienville Parish. Official gage of the new producer, the 1 Wise in 9-15n-6w, was 26,000,000 cu. ft. of gas per day on open flow through an 18/64-in. choke. Distillate output was about 2 bbl. per 1,000,000 cu. ft. The hole was drilled to a total depth of 8,222 ft., and 5½-in. producing string was

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set to 7,060 ft. It produces from the Pettit lime at 6,946-76 ft.

In Arkansas, the active southern part of Union County will have two new Smackover tests. N. L. Langham will drill the 1 Reynolds-Gamil Lumber Co. in SW NW 5-18s-16w, 1 mile southwest of Carter 1 Russell, a Smackover failure. The other wildcat, Lion Oil Co. 1 Charles, SW SE 28-18s-18w, is scheduled to go to 8,400 ft.

In the same county, Murphy Corp. has started a confirmation attempt at North New London field opened by Marine Oil Co. 1 Trigg, 33-17s 12w, which was completed in the Cotton Valley at 4,422-32 ft. The new well, a west offset to the discovery, has been planned to drill to 5,100 ft.

**NORTH LOUISIANA WILDCAT FAILURE**

LaSalle Parish: J. S. Michael et al 1 Nebo Oil Co. "G," SW SE SW 16-8n-4e, dry, TD 4,634 ft., no tops reported.

# Canadian Fields

## Canadian Gulf to Test Cretaceous Oil Show

CALGARY.—Canadian Gulf Oil Co.'s Caprona wildcat that struck oil in the Basal Cretaceous early this year has reached total depth and is being plugged back for tests in that discovery horizon. The well, Gulf-C.P.R.-Collins 7, in LSD 7, 19-36-19w4, is about midway between Stettler and Big Valley Devonian oil fields. The well found encouragement in an 8-ft. Cretaceous section prior to heading for Devonian objectives. Hole completed drilling at 6,350 ft., after finding the Devonian unproductive. It topped the Basal Cretaceous pay at 4,166 ft., and ran 65-minute drill-stem test from 4,162-74 ft. Natural gas reached the surface 18 minutes after valve was opened, with flow rate of 500,000 cu. ft. daily. Pipe recovery was a 525-ft. column of clean, water-free crude oil, with gravity around 30°. Influx rate was believed to be between 60 and 70 bbl. daily.

Trend Petroleum, Ltd., Royalite Oil Co., Ltd., and R. I. Clancey are starting a follow-up drilling program at Bolloque Lake, 65 miles north of Edmonton, where the team made a discovery of 23°-gravity crude oil in Lower Cretaceous sand last July. The team has staked Trend-Royalite-Bolloque Lake 2 in LSD 12, 14-64-26w4, about ½ mile southeast of the discovery well.

The discovery well was given a 44-hour pump test last July, and produced oil at a flush rate of 104 bbl. daily. Depth of the oil sand is about 2,806 ft.

Bailey-Imperial-Linaria 2, wildcat located in LSD 11, 24-61-27w4, about 50 miles north-northwest of Edmonton in central Alberta, has found about 7 ft. of oil-stained Cretaceous sand at 2,993-3,000 ft. Coring has been halted at 3,000 ft., and drill-stem test is slated to be run soon. The well is a Cretaceous test located 1 mile east of and down flank from Bailey-Linaria 1, which found some gas in the Cretaceous.

Albercan Oil Corp. expects to start gun-perforating casing for test of Lower Cretaceous sands at its Albercan-Castlewood 1, wildcat. This East Central Saskatchewan venture, in LSD 4, 12-36-16w3, completed drilling at 4,142 ft., and set 5½-in. casing at 2,550 ft. through two thin sand zones which indicated presence of some Lloydminster type heavy crude oil. The well is around 90 miles southeast of the Dina sector of the Lloydminster black oil region.

Royalite Oil Co. is continuing testing at its Royalite-Ruthilda 1, wildcat 12 miles or more south of the Albercan-Castlewood venture The Ruthilda well, in LSD 15, 5-34-17w3, completed at 4,518 ft., and cased through Cretaceous sands. Some oil encouragement has reportedly been obtained in gun perforating and testing to date, but commercial potentialities have not as yet been established.

**CANADIAN SUCCESSFUL WILDCATS**

Delhi-Amcan-Castor 1, LSD 3, 20-38-14w4, TD 3,715 ft., capped as a potential gas well.

Imperial-Scovil Lake 1, LSD 1, 19-45-8w4, TD 2,750 ft., capped as gas well, 628,000 cu. ft. daily.


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## Worthington Names New General European Manager

W. A. Finn has been named general European manager of Worthington Pump & Machinery Corp., according to an announcement by S. R. Williams, vice president in charge of foreign business. He replaces A. W. Fraser, who is assuming an executive sales position with Worthington and will make his headquarters in Chicago in February.

Finn graduated from the U. S. Naval Academy at Annapolis in 1922, and in 1929 joined Worthington as an estimator and sales engineer in the steam-power division. From 1930 to 1941 he acted as New England district sales manager. In 1946 he was named manager of the export department.

Fraser, after graduating from Northwestern University with a B. M. A. degree, joined Worthington training course in 1929 and became sales engineer in various Worthington offices and plants throughout the country. In 1937 he became Chicago district manager and in 1945 general European manager.

# Industry Appears To Be Well Started On Well-Drilling Goal for 1951

**by Polly DeArmond**

DESPITE today's unsettled conditions and their presently unknown influencing factors over all businesses, the oil industry appears to have at least started successfully toward the goals programed by itself for itself during 1951. A study of trends in the postwar years' activity shows that January figures are somewhat lower than an average month in a year's total. In 1950 the ratio of January completions to the cumulative total was 7.1 per cent; in 1949 it was 8.1 per cent; in 1948, 7.9 per cent; in 1947, 7.8 per cent; in 1946, 7.5 per cent. If this "initial" yardstick holds true for 1951, forecasts in The Oil and Gas Journal's issue of January 25, 1951, pages 182-183, are in line with operations reported for January.

Total wells drilled in January increased 9.5 per cent over the same month of record-breaking 1950. The Mid-Continent area (Oklahoma, Kansas, Nebraska, and Missouri) was up 30.6 per cent, while the Texas-New Mexico section rose 16.7 per cent. California gained 7.9 per cent in completions. The Eastern fields (New York, Pennsylvania, West Virginia, and Maryland) continued a steady long decline, falling 21.4 per cent. The North Central district (Illinois, Indiana, Kentucky, Ohio, and Michigan) dropped 10 per cent. The Southern states (Louisiana, Arkansas, Mississippi, Alabama, Georgia, Florida, and Tennessee) were off 9.7 per cent, while the Rocky Mountain region slipped 1 per cent.

Smaller over-all gains were noted in the comparison between January 1951 and January 1949. Total wells were up 5.8 per cent. Breakdowns by sections were as follows: Mid-Continent, up 60 per cent; Texas-New Mexico, up 19.1 per cent; Rockies, up 7.5 per cent; South, up 4.7 per cent; East, down 56.2 per cent; California, down 30.2 per cent; North Central, down 19.1 per cent.

The Mid-Continent paced a total 6.6 per cent increase over January 1948—the area jumped 41.6 per cent in completions. Texas and New Mexico were up 28.6 per cent. These gains offset the following decreases: East, off 56.3 per cent; California, down 38.8 per cent; Rockies, down 16.5 per cent; North Central, down 4.7 per cent; South, down 1.9 per cent.

Notable gains were recorded over January 1947, with total wells climbing 30.6 per cent. The Rockies showed 86.9 per cent more completions in January 1951. Texas-New Mexico jumped 69.3 per cent, the Southern states increased 62.9 per cent, and the Mid-Continent gained 51.3 per cent. California operators drilled 18.1 per cent more wells, and the North Central area was up 2.7 per cent. The only decrease was in the East, which dropped 58.8 per cent.

The greatest gains are reflected in the comparison of January with the corresponding month of the first postwar year. Total number of holes soared 53.7 per cent over January 1946. The Mid-Continent more than doubled its completions, up 149.7 per cent, and Texas-New Mexico climbed 109.2 per cent. The South jumped 94.6 per cent, the Rockies increased 91.1 per cent, and the North Central was up 11.5 per cent. The Appalachian area and California fell 60.4 per cent and 12.3 per cent, respectively.

## SUMMARY OF COMPLETIONS—JANUARY 1951

| | Total comp. | Oil | Gas | Dry | Under 2,500 ft. | 2,500-5,000 ft. | 5,000-7,500 ft. | 7,500-10,000 ft. | 10,000-12,500-ft. | Over 12,500 ft. | Total footage | Rigs and drilling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New York | 34 | 17 | 0 | 17 | 34 | 0 | 0 | 0 | 0 | 0 | 48,984 | 61 |
| Pennsylvania | 84 | 38 | 10 | 36 | 72 | 12 | 0 | 0 | 0 | 0 | 149,860 | 265 |
| West Virginia | 52 | 6 | 36 | 10 | 23 | 26 | 3 | 0 | 0 | 0 | 150,672 | 177 |
| Ohio | 85 | 32 | 19 | 34 | 45 | 39 | 1 | 0 | 0 | 0 | 190,783 | 112 |
| Kentucky | 75 | 29 | 19 | 27 | 37 | 18 | 0 | 0 | 0 | 0 | 147,922 | 76 |
| Illinois | 174 | 87 | 1 | 86 | 81 | 93 | 0 | 0 | 0 | 0 | 403,910 | 236 |
| Indiana | 64 | 27 | 2 | 35 | 53 | 11 | 0 | 0 | 0 | 0 | 114,783 | 209 |
| Michigan | 48 | 16 | 3 | 29 | 28 | 20 | 0 | 0 | 0 | 0 | 118,618 | 118 |
| Kansas | 363 | 177 | 24 | 162 | 55 | 306 | 2 | 0 | 0 | 0 | 1,184,413 | 396 |
| Neb., Mo., Iowa | 28 | 16 | 2 | 10 | 14 | 13 | 1 | 0 | 0 | 0 | 90,986 | 42 |
| Oklahoma | 518 | 288 | 15 | 215 | 141 | 244 | 105 | 16 | 11 | 1 | 1,967,341 | 757 |
| Texas | 1,305 | 861 | 49 | 395 | 310 | 494 | 364 | 115 | 20 | 2 | 5,897,062 | 1,239 |
| North | 208 | 112 | 0 | 96 | 93 | 86 | 29 | 0 | 0 | 0 | 634,990 | 158 |
| West Central | 166 | 93 | 0 | 73 | 64 | 84 | 18 | 0 | 0 | 0 | 525,650 | 121 |
| West | 370 | 294 | 0 | 76 | 59 | 99 | 167 | 33 | 10 | 2 | 2,008,565 | 512 |
| Panhandle | 60 | 45 | 8 | 7 | 5 | 53 | 1 | 1 | 0 | 0 | 194,622 | 76 |
| Eastern | 102 | 74 | 1 | 27 | 10 | 47 | 36 | 9 | 0 | 0 | 490,824 | 51 |
| Gulf Coast | 207 | 119 | 33 | 55 | 17 | 67 | 59 | 55 | 9 | 0 | 1,241,880 | 192 |
| Southwest | 192 | 124 | 7 | 61 | 62 | 58 | 54 | 17 | 1 | 0 | 800,531 | 129 |
| Louisiana | 187 | 110 | 15 | 62 | 40 | 37 | 22 | 49 | 34 | 5 | 1,192,452 | 241 |
| Northern | 99 | 54 | 12 | 33 | 36 | 35 | 13 | 13 | 2 | 0 | 380,659 | 97 |
| Southern | 88 | 56 | 3 | 29 | 4 | 2 | 9 | 36 | 32 | 5 | 811,793 | 144 |
| Arkansas | 41 | 25 | 1 | 15 | 9 | 27 | 1 | 3 | 1 | 0 | 139,909 | 34 |
| Mississippi | 16 | 10 | 0 | 6 | 0 | 1 | 11 | 3 | 1 | 0 | 110,143 | 27 |
| Ala., Ga., Fla. | 7 | 2 | 0 | 5 | 0 | 5 | 0 | 1 | 1 | 0 | 35,729 | 6 |
| Montana | 14 | 12 | 0 | 2 | 12 | 2 | 0 | 0 | 0 | 0 | 26,980 | 44 |
| Wyoming | 48 | 30 | 2 | 16 | 1 | 28 | 13 | 3 | 3 | 0 | 246,562 | 164 |
| Colorado | 19 | 5 | 2 | 12 | 8 | 2 | 9 | 0 | 0 | 0 | 67,809 | 52 |
| Utah | 4 | 0 | 0 | 4 | 2 | 2 | 0 | 0 | 0 | 0 | 10,360 | 21 |
| New Mexico | 53 | 25 | 17 | 11 | 21 | 17 | 8 | 7 | 0 | 0 | 232,464 | 109 |
| California | 150 | 104 | 2 | 44 | 43 | 58 | 34 | 11 | 3 | 1 | 633,842 | 228 |
| Miscellaneous | §3 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 10,418 | §22 |
| Total January 1951 | 3,372 | †1,917 | 221 | *1,234 | 1,049 | 1,458 | 574 | 206 | 74 | 9 | 13,172,011 | ‡4,636 |
| Total December 1950 | 3,514 | 2,008 | 227 | 1,279 | 1,194 | 1,428 | 584 | 205 | 90 | 13 | 13,522,453 | 5,279 |
| Total January 1950 | 3,079 | 1,808 | 227 | 1,044 | 1,112 | 1,232 | 462 | 184 | 79 | 10 | 11,546,381 | 4,349 |

*Incl. 64 service wells: N. Y. 17, Pa. 31, Ohio 5, Ill. 2, Kans. 5, Okla. 3, Calif. 1. †Incl. 32 distillate wells: Okla. 6, Tex. Gulf 10, S.W. Tex. 4, No. La. 9, So. La. 2, Miss. 1. ‡Incl. all wells rigged up and/or drilling at month end. §Misc. comp. incl. Md. 2 gas at 7,275 ft. and So. Dak. 1 dry at 3,143 ft.; misc. rigs incl. Ariz. 4, Dakotas 6, Idaho 2, Maryland 7, Nevada 3.

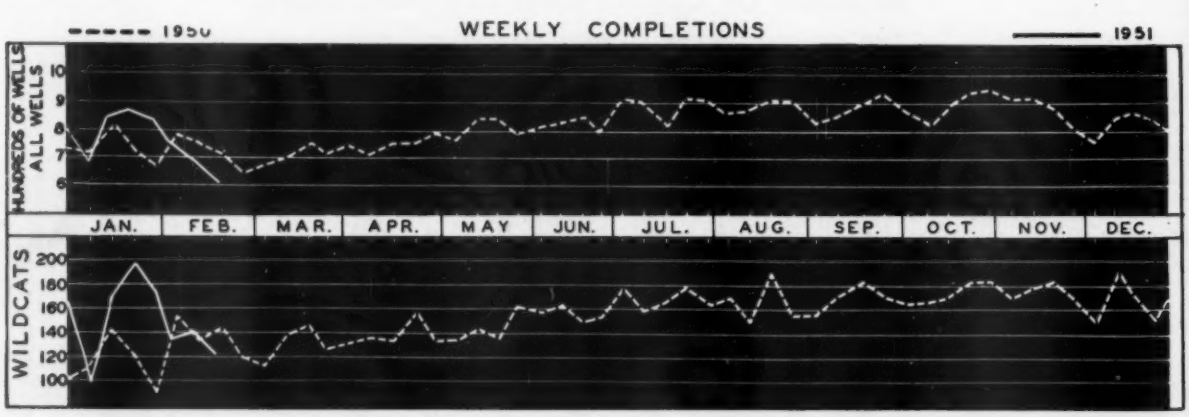
# CURRENT STATISTICS

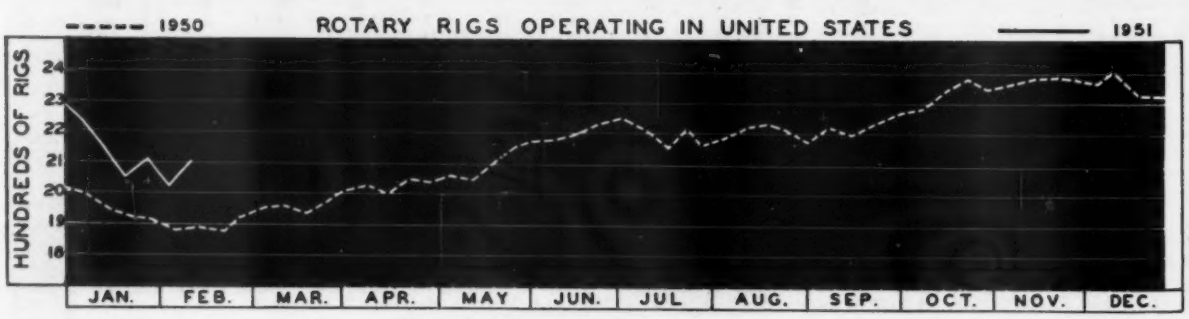
## EXPLORATION

### WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED FEBRUARY 17, 1951

| | Total of all wells | | | | | Feb. 17 | | Wildcat completions and discoveries | | | | | Cumulative total, 1951 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Comp. | Oil | Gas | Dry | Footage | 1951 | 1950 | Oil | Dist. | Gas | Dry | Total | Oil | Dist. | Gas | Dry | Total |
| New York | 4 | 2 | 0 | *2 | 5,824 | 49 | 97 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pennsylvania | 10 | 5 | 1 | †4 | 27,154 | 104 | 153 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| West Virginia | 9 | 1 | 5 | 3 | 25,168 | 87 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 5 |
| Ohio | 13 | 3 | 5 | *5 | 31,219 | 112 | 124 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 5 | 7 |
| Indiana | 13 | 3 | 0 | 10 | 23,204 | 133 | 137 | 0 | 0 | 0 | 4 | 4 | 3 | 0 | 0 | 16 | 19 |
| Kentucky | 8 | 4 | 0 | 4 | 12,390 | 114 | 111 | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 17 | 19 |
| Illinois | 31 | 19 | 0 | 12 | 80,654 | 282 | 308 | 0 | 0 | 0 | 4 | 4 | 7 | 0 | 0 | 41 | 48 |
| Michigan | 11 | 6 | 0 | 5 | 31,870 | 84 | 101 | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 1 | 30 | 31 |
| Kansas | 68 | 17 | 11 | ‡40 | 220,109 | 541 | 441 | 2 | 0 | 0 | 16 | 18 | 26 | 0 | 1 | 94 | 121 |
| Nebraska | 6 | 2 | 0 | 4 | 23,082 | 40 | 9 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 1 | 15 | 16 |
| Oklahoma | 65 | 41 | 4 | 20 | 245,125 | 748 | 633 | 0 | 0 | 0 | 7 | 7 | 30 | 0 | 5 | 101 | 136 |
| Texas | 259 | 181 | 11 | 67 | 1,185,643 | 2,129 | 2,054 | 14 | 1 | 0 | 45 | 60 | 82 | 9 | 12 | 351 | 454 |
| North Central (Dist. 7-B & 9) | 87 | 56 | 0 | 31 | 266,761 | 632 | 606 | 9 | 0 | 0 | 20 | 29 | 39 | 0 | 0 | 143 | 182 |
| West (Dist. 7-C & 8) | 78 | 66 | 0 | 12 | 430,929 | 641 | 586 | 3 | 1 | 0 | 10 | 14 | 18 | 1 | 0 | 76 | 95 |
| Panhandle (Dist. 10) | 17 | 10 | 7 | 0 | 51,124 | 99 | 168 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 |
| Eastern (Dist. 5, 6, & 6-P) | 16 | 11 | 2 | 3 | 85,967 | 149 | 141 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 21 | 21 |
| Gulf Coast (Dist. 2 & 3) | 37 | 21 | 1 | 15 | 235,359 | 318 | 282 | 1 | 0 | 0 | 10 | 11 | 16 | 6 | 10 | 52 | 84 |
| Southwest (Dist. 1 & 4) | 24 | 17 | 1 | 6 | 115,503 | 290 | 271 | 1 | 0 | 0 | 4 | 5 | 9 | 2 | 2 | 55 | 68 |
| Louisiana | 19 | 11 | 1 | 7 | 165,605 | 282 | 350 | 0 | 0 | 0 | 4 | 4 | 5 | 0 | 0 | 40 | 45 |
| Northern | 4 | 3 | 0 | 1 | 10,410 | 135 | 187 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 22 | 24 |
| Southern | 15 | 8 | 1 | 6 | 155,195 | 147 | 163 | 0 | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 18 | 21 |
| Arkansas | 1 | 0 | 0 | 1 | 4,253 | 56 | 51 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 9 | 10 |
| Mississippi | 6 | 1 | 0 | 5 | 47,563 | 30 | 44 | 0 | 0 | 0 | 5 | 5 | 3 | 1 | 0 | 12 | 16 |
| Southeastern States | 1 | 1 | 0 | 0 | 7,986 | 10 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Montana | 7 | 6 | 0 | 1 | 15,958 | 24 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Wyoming | 9 | 8 | 0 | 1 | 49,146 | 82 | 84 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 14 | 16 |
| Colorado-Utah | 2 | 1 | 0 | 1 | 11,680 | 33 | 17 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 18 | 18 |
| New Mexico | 17 | 6 | 6 | 5 | 84,938 | 91 | 99 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 3 | 11 | 15 |
| California | 43 | 36 | 0 | 7 | 172,905 | 240 | 240 | 1 | 0 | 0 | 5 | 6 | 6 | 0 | 1 | 47 | 54 |
| Miscellaneous (Nevada) | 1 | 0 | 0 | 1 | 4,125 | 4 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 2 | 4 |
| Total United States | 603 | 354 | 44 | 205 | 2,475,601 | 5,275 | 5,156 | 18 | 1 | 1 | 101 | 121 | 169 | 10 | 30 | 830 | 1,039 |
| Total previous week | 684 | 393 | 64 | 227 | 2,850,923 | .... | .... | 25 | 1 | 6 | 108 | 140 | 151 | 9 | 29 | 729 | 918 |
| Total February 17, 1950 | 701 | 399 | 39 | 263 | 2,592,678 | .... | .... | 23 | 0 | 5 | 116 | 144 | 131 | 12 | 32 | 725 | 900 |

Service wells included: *2, †4, ‡1.



## DAILY AVERAGE PRODUCTION FOR WEEK

| | Feb. 17 crude oil | B. of M. Feb. demand | Feb. 10 crude oil |
|---|---|---|---|
| Alabama | 2,200 | 2,400 | 2,550 |
| Arkansas | 79,950 | 88,000 | 78,700 |
| California | 956,800 | 968,000 | 957,900 |
| Colorado | 74,200 | 72,000 | 76,300 |
| Eastern | 51,900 | 67,000 | 58,500 |
| Florida | 1,450 | 1,600 | 1,675 |
| Illinois | 159,400 | 172,000 | 157,200 |
| Indiana | 26,400 | 31,000 | 27,800 |
| Kansas | 319,350 | 304,000 | 235,150 |
| Kentucky | 27,500 | 31,000 | 28,100 |
| Louisiana | 605,600 | 620,000 | 605,200 |
| North Louisiana | 116,600 | ..... | 116,200 |
| South Louisiana | 489,000 | ..... | 489,000 |
| Michigan | 41,400 | 46,000 | 42,700 |
| Mississippi | 95,650 | 116,000 | 99,350 |
| Montana | 20,900 | 23,000 | 22,300 |
| Nebraska | 10,350 | 7,000 | 10,100 |
| New Mexico | 136,325 | 138,000 | 136,325 |
| Oklahoma | 485,950 | 483,000 | 505,300 |
| Texas | 2,560,450 | 2,425,000 | 2,560,450 |
| Dist. 1 (Southwest) | 31,800 | ..... | 31,800 |
| Dist. 2 (Southwest) | 152,050 | ..... | 152,050 |
| Dist. 4 (Southwest) | 239,800 | ..... | 239,800 |
| Dist. 3 (Gulf Coast) | 457,000 | ..... | 457,000 |
| Dist. 5 (Eastern) | 46,650 | ..... | 46,650 |
| Dist. 6 (Eastern) | 103,800 | ..... | 103,800 |
| East Texas field | 272,000 | ..... | 272,000 |
| Dist. 7-C (West) | 78,575 | ..... | 78,575 |
| Dist. 8 (West) | 864,925 | ..... | 864,925 |
| Dist. 7-B (W. Central) | 77,400 | ..... | 77,400 |
| Dist. 9 (N. Central) | 146,450 | ..... | 146,450 |
| Dist. 10 (Panhandle) | 90,000 | ..... | 90,000 |
| Utah | 3,300 | 5,000 | 3,300 |
| Wyoming | 191,100 | 180,000 | 189,900 |
| Total United States | *5,850,175 | 5,780,000 | 5,798,800 |
| Change from previous week, up | 51,375 | | |
| Canada | 104,930 | ..... | 77,960 |

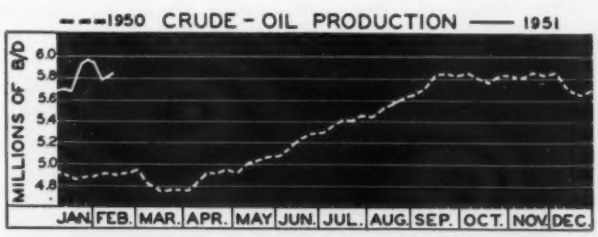
Total U. S. production January 1-February 17 .. †291,045,755 bbl.
Same period last year (crude plus cond.) ..... 237,899,770 bbl.

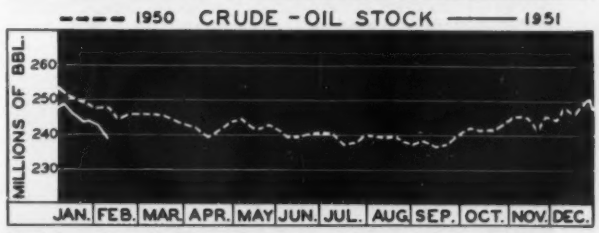
*Not including 108,030 bbl. condensate. †Including 4,995,025 bbl. condensate.

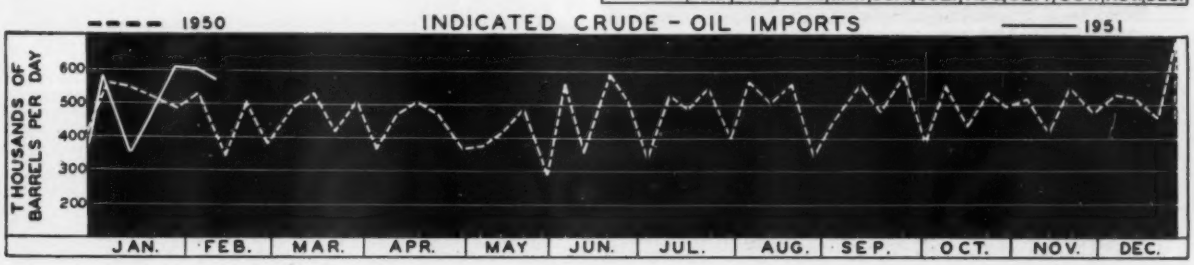
## CRUDE-OIL STOCKS BY STATES OF ORIGIN*
(Thousands of barrels)

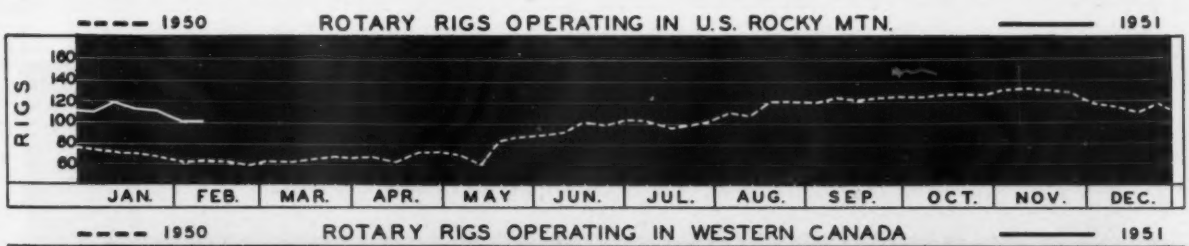
| | Feb. 10, 1951 | Feb. 3, 1951 | Feb. 11, 1950 |
|---|---|---|---|
| Pennsylvania grade | 2,116 | 2,141 | 2,772 |
| Other Appalachian | 1,287 | 1,096 | 1,706 |
| Illinois, Indiana, Michigan | 9,996 | 10,026 | 11,434 |
| Arkansas | 2,757 | 2,419 | 3,048 |
| Louisiana | 13,013 | 14,687 | 14,692 |
| North | 2,701 | 2,967 | 3,651 |
| Gulf | 10,906 | 11,720 | 11,041 |
| Mississippi | 3,296 | 3,536 | 2,569 |
| New Mexico | 6,854 | 6,924 | 7,204 |
| Oklahoma and Kansas | 37,035 | 37,401 | 35,430 |
| Texas | 110,967 | 114,172 | 109,442 |
| East Texas | 14,143 | 14,174 | 14,779 |
| West Texas | 43,170 | 43,903 | 38,149 |
| Texas Gulf | 25,907 | 27,332 | 29,800 |
| Other Texas | 27,747 | 28,763 | 26,714 |
| Rocky Mountain | 12,319 | 12,148 | 13,169 |
| California | 31,597 | 31,640 | 37,292 |
| Foreign | 7,042 | 6,608 | 6,692 |
| Total | 238,873 | 242,798 | 245,450 |

*Bureau of Mines.



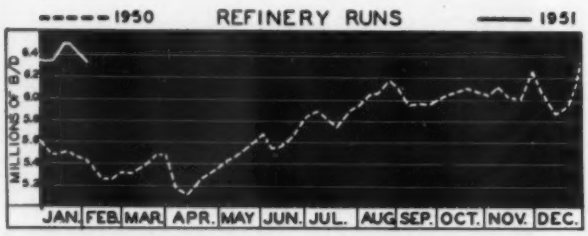



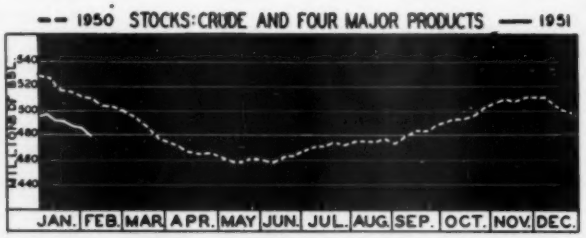
## A.P.I. REFINERY REPORT, FEBRUARY 10

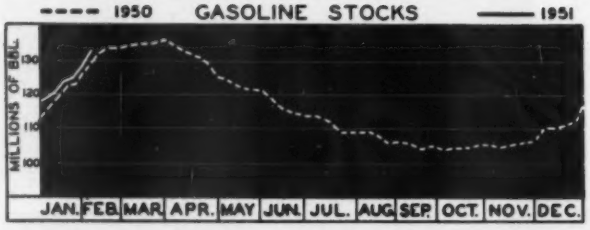
(Thousands of barrels)

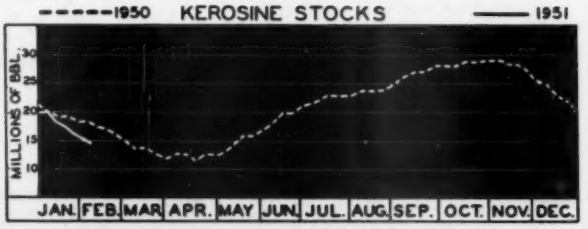
| District— | Daily avg. crude runs | Daily average production: Gasoline* | Kerosine | Distillate | Residual | Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline† | Kerosine | Distillate | Residual | Bureau of Mines, February 1950: Daily avg. crude runs | Daily average production: Gasoline* | Kerosine | Distillate | Residual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East Coast | 973 | 379.1 | 40.7 | 253.8 | 259.3 | 25,103 | 5,819 | 16,848 | 9,042 | 784 | 343.4 | 36.5 | 168.6 | 209.9 |
| Appalachian: | | | | | | | | | | | | | | |
| District 1 | 93 | 35.1 | 5.0 | 16.3 | 13.0 | 2,897 | 284 | 496 | 258 | 89 | 39.4 | 6.3 | 14.1 | 12.6 |
| District 2 | 79 | 32.7 | 5.6 | 6.6 | 24.0 | 1,173 | 80 | 80 | 120 | 63 | 29.1 | 4.9 | 7.2 | 17.2 |
| Ind., Ill., Ky. | 1,230 | 604.2 | 71.5 | 242.4 | 190.4 | 29,610 | 3,171 | 6,887 | 3,087 | 980 | 496.1 | 72.2 | 170.6 | 169.6 |
| Okla., Kans., Mo. | 514 | 265.3 | 15.4 | 114.8 | 70.0 | 14,288 | 604 | 6,332 | 1,091 | 450 | 254.4 | 16.6 | 99.3 | 65.9 |
| Inland Texas | 209 | 135.3 | 10.4 | 29.7 | 41.0 | 4,297 | 370 | 695 | 643 | 206 | 137.3 | 12.9 | 27.8 | 41.1 |
| Texas Gulf Coast | 1,491 | 653.9 | 131.6 | 361.8 | 277.6 | 23,081 | 2,145 | 8,235 | 5,047 | 1,218 | 579.2 | 103.5 | 243.4 | 226.1 |
| La. Gulf Coast | 504 | 218.0 | 65.7 | 131.0 | 71.3 | 8,802 | 1,036 | 2,159 | 2,011 | 440 | 205.5 | 58.1 | 92.2 | 50.0 |
| N. La. and Ark. | 75 | 29.6 | 6.4 | 18.9 | 7.0 | 2,605 | 303 | 960 | 64 | 73 | 27.1 | 9.2 | 12.2 | 15.1 |
| Rocky Mountain: | | | | | | | | | | | | | | |
| New Mexico | 13 | 7.4 | .3 | 2.9 | 2.8 | 105 | 25 | 67 | 32 | 14 | 7.8 | .3 | 2.5 | 3.3 |
| Other Rocky Mtn. | 213 | 108.0 | 9.6 | 37.9 | 48.7 | 4,682 | 203 | 1,285 | 780 | 175 | 82.4 | 5.3 | 35.7 | 40.3 |
| California | 944 | 398.4 | 3.4 | 129.8 | 382.6 | 16,491 | 653 | 9,021 | 18,031 | 824 | 350.4 | 12.4 | 152.4 | 320.8 |
| February 10, 1951 | 6,338 | 2,867.0 | 365.6 | 1,345.7 | 1,387.7 | 133,134 | 14,693 | 53,065 | 40,206 | 5,316 | 2,552.1 | 338.2 | 1,026.0 | 1,171.9 |
| February 3, 1951 | 6,395 | 2,854.4 | 406.1 | 1,397.9 | 1,365.9 | 129,700 | 15,634 | 56,776 | 40,371 | ..... | ..... | ..... | ..... | ..... |
| February 11, 1950 | 5,362 | 2,555.3 | 332.4 | 963.0 | 1,241.9 | 129,362 | 17,120 | 60,602 | 52,865 | ..... | ..... | ..... | ..... | ..... |

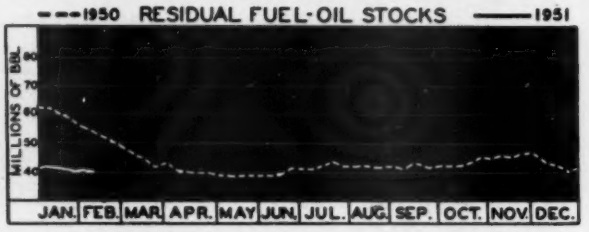
*At refineries including natural blended. †Finished and unfinished.

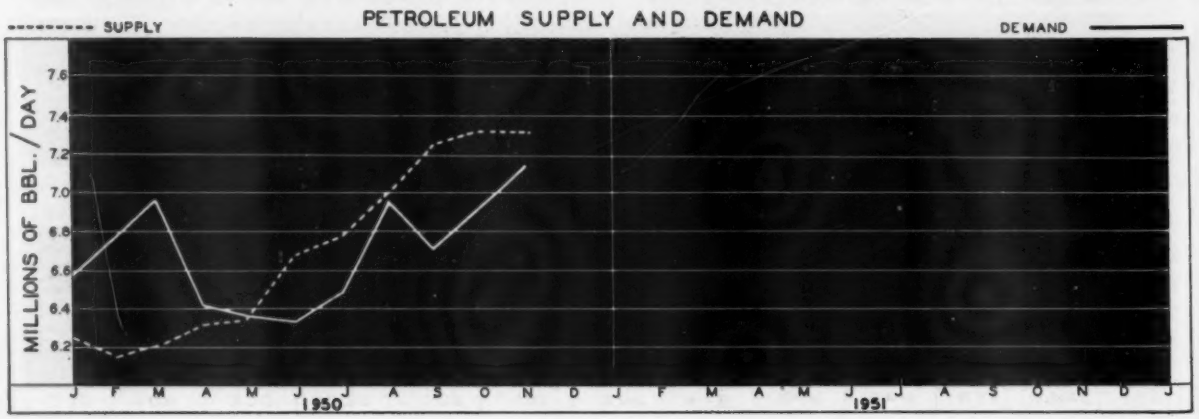




## CRUDE PRICES
### GRAVITY SCHEDULE

| | Signal Hill, Calif.‡ | Oklahoma, Kansas | Gulf Coast Tex.* | West Tex.† |
|---|---|---|---|---|
| 18-18.9 | $1.93 | .... | .... | .... |
| 19-19.9 | 1.98 | .... | .... | .... |
| 20-20.9 | 2.03 | $2.25 | .... | $2.12 |
| 21-21.9 | 2.07 | 2.27 | .... | 2.14 |
| 22-22.9 | 2.12 | 2.29 | .... | 2.16 |
| 23-23.9 | 2.18 | 2.31 | .... | 2.18 |
| 24-24.9 | 2.24 | 2.33 | $2.56 | 2.20 |
| 25-25.9 | 2.30 | 2.35 | 2.58 | 2.22 |
| 26-26.9 | 2.36 | 2.37 | 2.60 | 2.24 |
| 27-27.9 | 2.41 | 2.39 | 2.62 | 2.26 |
| 28-28.9 | 2.46 | 2.41 | 2.64 | 2.28 |
| 29-29.9 | 2.52 | 2.43 | 2.66 | 2.30 |
| 30-30.9 | 2.57 | 2.45 | 2.68 | 2.32 |
| 31-31.9 | 2.62 | 2.47 | 2.70 | 2.34 |
| 32-32.9 | 2.68 | 2.49 | 2.72 | 2.36 |
| 33-33.9 | .... | 2.51 | 2.74 | 2.38 |
| 34-34.9 | .... | 2.53 | 2.76 | 2.40 |
| 35-35.9 | .... | 2.55 | 2.78 | 2.42 |
| 36-36.9 | .... | 2.57 | 2.80 | 2.44 |
| 37-37.9 | .... | 2.59 | 2.82 | 2.46 |
| 38-38.9 | .... | 2.61 | 2.84 | 2.48 |
| 39-39.9 | .... | 2.63 | 2.86 | 2.50 |
| 40 and above | .... | 2.65 | 2.88 | 2.52 |

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

## FLAT CRUDE PRICES

Representative posted schedules per barrel.

| | |
|---|---|
| East Texas† | $2.65 |
| Kettleman Hills, California* | 2.80 |
| Beauregard Parish | 2.60 |
| Illinois Basin | 2.77 |
| Pecos County, Texas (Yates) | 2.35 |
| Bradford, Pennsylvania | 4.25 |
| Eastern Ill. and Western Ind.† | 2.77 |
| Tomball, Texas Gulf Coast | 2.83 |

*37°-37.9°. †35° and above.

A COMBINATION of circumstances resulted in a reduction of .5 cent a gallon in prices paid for natural gasoline. Pipe-line gasoline from the Mid-Continent area is now the intermediate grade with slightly reduced vapor pressure and a little less natural gasoline in the blend. Also, continuing high demand for heating oils in the northern states requires line space for light distillates, limiting the total volume of gasoline that can be delivered to the lines.

More than 40 per cent of all natural-gas liquids used by refiners east of California is blended at refineries on the Gulf Coast. For the past several weeks movement of finished gasoline from these refineries has been below normal. Cold weather in the northeastern states has kept distillate demands at a high level, requiring the use of a high percentage of the clean tankers for movement of home-heating fuels. Gulf Coast refiners shipped about 1,100,000 bbl. more distillate fuel than they produced in the week ended February 10.

The combination of reduced consumption of natural gasoline by both Mid-Continent and Gulf Coast refiners resulted in a temporary oversupply and a reduction in price. The new Group 3 price for 26-70 natural is 6.375.

Proof of the lack of balance between supply and demand for heavy fuel on the East Coast of the continuing reports of bidding at prices well above the postings of major suppliers. It is reported that a few suppliers have a ceiling of $2.50 a barrel for barge deliveries of residual in New York Harbor, but these represent only a small per cent of the total volume. A large part of the residual for the area is delivered to regular customers at $2.15 a barrel. Top posting by major suppliers for low-sulfur residual is $2.30 with little or none available for spot deliveries.

## REPRESENTATIVE QUOTATIONS

Representative spot-market quotation of leading suppliers as of February 19, 1951. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

### GASOLINE, KEROSINE, AND FUEL OILS

| | Mid-Continent Group 3 | New York Harbor (barge) | Texas Gulf Coast |
|---|---|---|---|
| Regular gasoline, 80-82 octane | 10⅛-10½ | 12-12.75 | 10¾-11 |
| Premium gasoline, 86-88 octane | 11⅛-11½ | 13.5-13.75 | 11½-12 |
| 42-44 w.w. kerosine | 9¼-9⅜ | 10-10.1 | 8¾-9 |
| No. 2 straw fuel oil | 8⅜-8⅝ | 9-9.25 | 7¾-8 |
| No. 6 residual | $1.80-1.90 | $2.25-2.30 | $1.75-1.90 |

### NATURAL GASOLINE

| | Group 3 | North Texas | N. La. |
|---|---|---|---|
| Grade 26-70 | 6⅜ | 5⅞ | 6⅛ |
| Grade 18-55 | 7.65 | 7.15 | 7.40 |

### LUBRICATING OILS

**South Texas**

| | |
|---|---|
| 200 vis., No. 2-3 neutral | 13-13.5 |
| 750 vis., No. 3-4 neutral | 16 |
| 2,000 No. 5-6 neutral | 18-19 |

### LUBRICATING OILS

**Mid-Continent**

| | |
|---|---|
| 150-160 vis., D bright stock, 0-10 pp. | 29-30 |
| 200 vis., No. 3 neutral, 0-10 pp. | 17.5-18.5 |

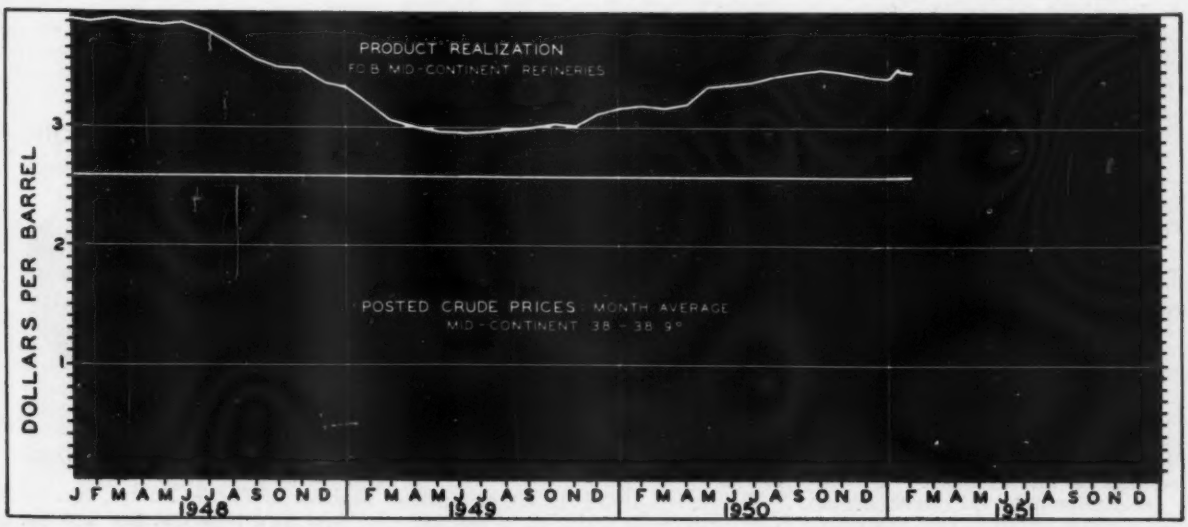
**Western Pennsylvania**

| | |
|---|---|
| 145-155 vis., 10 p.t. bright stock | 32.5 |
| 180 vis., 0 p.t. neutral | 31.5 |

### WAX

**Mid-Continent**

| | |
|---|---|
| 132-134 A.M.P. | 6.0 |


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
POSTED CRUDE PRICES - MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
DOLLARS PER BARREL
3
2
1
J F M A M J J A S O N D
1948
J F M A M J J A S O N D
1949
J F M A M J J A S O N D
1950
J F M A M J J A S O N D
1951

*In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.48 for week ended February 10, $3.49 for previous week, and $3.23 for February 1950.*

# EQUIPMENT MEN . . . in the News

## C. J. Woodard Assumes New Duties at Pelton

In a recent announcement by W. F. Boyle, vice president and general manager, Pelton Water Wheel Co., it

W. F. BOYLE

C. J. WOODARD

was stated that C. J. Woodard, manager of the oil-industry machinery division, has assumed the added duties of plant manager of the Los Angeles factory, which includes supervision of engineering, manufacturing, sales, and service on all of Pelton's products manufactured there.

Woodard joined the Pelton organization as an engineer in the hydraulic turbine and valve division. He was later assigned to the development and marketing of long-stroke hydraulic pumping equipment. Prior to joining Pelton, Woodard attended Stanford University and California Institute of Technology.

## Mason Made Personnel Head of Arthur G. McKee

The appointment of Walter C. Mason as director of personnel for Arthur G. McKee & Co. has been announced by H. E. Widdell, president. Mason will be in charge of all personnel and employe relations with his headquarters in Cleveland.

Mason resigned his position with the E. F. Hauserman Co., where he also served as the personnel director, to take over his duties with Arthur G. McKee & Co.

## Tulsa Foundry Firm Will Install Meehanite Process

Meehanite Metal Corp., New Rochelle, N. Y., has announced that Empire Pattern & Foundry Co., Tulsa, has contracted to install the Meehanite manufacturing processes and will in the future manufacture Meehanite castings of various types.

Meehanite Metal Co. (South Africa), Ltd., Johannesburg, has announced through its associate, Meehanite Metal Corp., that two additional companies in South Africa are installing Meehanite manufacturing processes. They are H. Incledon & Co. (South Africa), Ltd., Johannesburg, and Johnson & Fletcher, Ltd., Salisbury, Southern Rhodesia.

## Keelan Joins Diamond Drilling Sales Staff

Ed Keelan, former sales manager for Soll Core Barrel Co., has joined Diamond Drilling Co., Long Beach, which has taken over exclusive distributorship on the Soll telescoping core barrel and the standard Soll core bits and barrels.

Keelan will continue to serve his present customers in the Los Angeles Basin, who are coring with Soll products. He is well known throughout California, having served with the Standard Oil Co. of California in its drilling department prior to his connection with Soll.

## Schlumberger's Paris Manager Is in Houston

J. L. Mathieu, manager, Societe de Prospection Electrique (Schlumberger), Paris, is in Houston attending Schlumberger's technical meeting. This is Mathieu's first trip back to the states since being made manager of Schlumberger's Paris office in 1947. Mathieu started with Schlumberger in Houston in 1933 and from then until 1944 he was vice president and manager of operations. From 1945 to 1947 he was general manager of Schlumberger's South American operations.

Mathieu predicts that within 15 years, oil production in western Europe and Africa will increase to the point where these countries should become self-sufficient in oil. He plans to return to France within the next 2 weeks.

## Oehler to Manage Dravo's Engineering Works Sales

John W. Oehler has been named sales manager of the engineering works division of Dravo Corp., Pittsburgh.

Oehler is a 1933 graduate of Purdue University with a degree in mechanical engineering. He joined Dravo Corp. in 1946 and since has been a member of the sales-engineering staff.

## Nechemias Made Industrial Sales Manager for Wagner

Herbert B. Nechemias was recently appointed manager of the industrial - sales department at Wagner Electric Corp. succeeding J. S. Smith, who was appointed director of purchasing.

Nechemias is a graduate of the Georgia School of Technology where he obtained a degree in electrical engineering. He joined Wagner in 1938 as a student engineer and spent 12 years in the sales department prior to his promotion.

## Radian Instrument Opens Office, Plant at Dallas

The Radian Instrument Co. has established its offices and manufacturing plant at Dallas, according to announcement by Cullen R. Rogers, president.

Under the trade name of Rainco, it will engage in the design, manufacture, and sale of geophysical and electronic equipment.

Other principal members of the firm are G. L. Hoehn, Jr., vice president in charge of research and development, and Thomas W. Hatch, secretary-treasurer. Alfred L. Sanford and Raymond D. Mallow are the electrical engineers. The Radian Instrument Co. was formerly known as Geotronics Laboratories, Inc., also located at Dallas.

## Graham to Manage Pacific Pump Mid-Continent Sales

Appointment of G. F. (Bill) Graham as sales manager, Mid-Continent division, Pacific Pumps, Inc., to handle Pacific's oil-well plunger-pump line, has been announced by Roy A. Dunbar, president of the Mid-Continent division of Pacific Pumps, Inc.

G. F. GRAHAM

Graham's headquarters will be in Tulsa. The appointee is well known in the Mid-Continent petroleum industry through his 27 years of experi-

ence selling oil-well plunger pumps in that area.

For the past 17 years Graham has been with Mid-Continent division of Pacific Pumps and his experience in the industry includes work in the Texas, Arkansas, and Louisiana fields.

Graham has occupied the post of district manager of Pacific's northern division, including Kansas, Illinois, and the Rocky Mountain fields.

## Kirby Made West Texas District Manager for BJ

*JOHN KIRBY*

C. F. (Bud) Vincent, Mid-Continent sales manager, Byron Jackson Co. Oil Tool Division, Houston, has announced the promotion of John Kirby. Kirby will be the BJ district manager for West Texas with headquarters in Odessa. Kirby, known in the West Texas area, spent 4 years with Halliburton Cementing Co. and 4 years with Security Engineering Co. before joining Byron Jackson Co. as sales representative in 1947.

## R. J. Bell Joins Rust-Oleum Sales Force

Roy J. Bell has been appointed factory representative in Oklahoma and Kansas for Rust-Oleum Corp., Evanston, Ill. He will make his headquarters in Tulsa.

Until his recent retirement, Bell was manager of the purchasing and transportation division of The California Co., a subsidiary of Standard Oil Co. of California, in New Orleans. He is a veteran of 43 years of active service in the oil industry on the Pacific Coast and the Gulf Coast area.

## Pape Resigns From H. K. Porter Co.

Howard Pape, vice president of H. K. Porter Co., Inc., has announced his resignation. Pape joined Jarecki Manufacturing Co. as vice president and director in charge of operations in March 1945. He transferred the company's headquarters to Houston and this company was purchased by H. K. Porter Co. in July 1949.

Jarecki then became a division of the parent company at which time Pape was made a vice president of H. K. Porter Co.

## Mission Manufacturing Marks Twenty-fifth Anniversary

Mission Manufacturing Co., Houston, one of the country's leading makers of oil-field equipment, is celebrating its twenty-fifth anniversary year throughout 1951. This company began its existence in December 1925 as Mission Sales Co., functioning as sales agent for a line of oil-field equipment and supplies.

In 1932, the company was reorganized as Mission Manufacturing Co., for the purpose of manufacturing and selling oil-field specialties. W. Bedford Sharp was president and sales manager, and A. M. Foute secretary and office manager. A small machine shop in Houston was its first plant. In 1935 the company moved into its present Houston plant.

Principal products are Mission slush-pump pistons, piston rods, liners, valves, and self-sealing packings; "Rolling Dog" rotary, tubing, and casing slips; Mission tubing swabs; plug valves; and "Streamlined Flow" centrifugal pumps.

## Athey Products Announces Expanded Sales Department

The appointments of Worthington J. Gross as manager, Governmental Division at Washington, D. C., and Bert C. Landstrom as district representative for the seven eastern states and the northeastern part of Canada, have been announced by T. V. Shea, general sales manager of Athey Products Corp., Chicago.

Prior to his association with Athey, Gross was affiliated with Engineering & Research Corp. as assistant to the president in charge of government sales. Previous to that he handled the Washington business of Diebold, Inc., and Acme Visible Records, Inc.

Landstrom has been associated with the heavy-equipment industry for 13 years. He was successively salesman, branch manager, and sales manager of Beckwith Machinery Co., which has been one of the largest distributors of Athey equipment for many years.

*(Continued on page 252)*

# CLASSIFIED ADVERTISING

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

DISPLAY CLASSIFIED
$12.00 a column inch one issue . . .
10% Discount three or more issues.

UNDISPLAYED CLASSIFIED 12c a word one issue. 10% Discount three or more issues. $3.00 minimum charge. Blind Box in our care counts nine words. Payable in Advance.

## EQUIPMENT FOR SALE

**USED ROTARY AND CABLE TOOL DRILLING TOOLS, WIRE LINES, E. A. KELLY, BOX 861, OKLAHOMA CITY. PHONE 5-6407.**

FOR SALE: Complete Brewster CR 300 Rotary Rig, with all tools, 4200′ 3½″ drill pipe, 2 compounded GAK Waukesha Motors. Rig in extra good condition. A bargain at $40,000.00. Just completed well in Butler County, Kansas. A. D. Allison & Co., 715 Brown Building, Wichita, Kansas.

GOOD BUY—8″ COLLARS
28 lb. Line Pipe at Dallas.
Oilton Pipe & Supply Co., Oilton, Okla.

CARDWELL Spudder, Model R-L, complete with mast, power, tools, doghouse, all ready to go. $14,000.00. E. E. Brook, 807 Colcord Bldg., Oklahoma City, or Phone L.D.231.

FOR SALE: One 5″ x 8″ Denver-Gardner FXX pump. Wm. M. Hanlon, Box 1724, Billings, Montana, Phone 93193.

FOR SALE: Complete refinery, absorption type, 35,000 bbl. capacity. Will sell as complete unit or by individual items. Complete inventory furnished on request. Contact W. W. Teer, Box 1351, Wichita Falls, Texas. Phone 2-1821.

BUCYRUS CABLE Tool Spudder 36-L 1948 Model, perfect condition, 54 foot mast, dual cathead, dual pneumatic tired wheels. All tools from 24″, all accessories. An-Son Petroleum Corp., First National Bldg., Oklahoma City, Okla. Phone 7-4497.

## NEW STEEL PIPE

**20″ O.D.**
**.281 wall—40 foot lengths**
**Electric Weld**
**Immediate Delivery**
**Subject to prior sale**
**Write—Wire—Phone**

**Sonken-Galamba Corp.**

**2nd and Riverview (X-691)**
**Kansas City 18, Kansas**
**THatcher 5243**

## NEED CASING AND TUBING?

6000 feet new 5½″ 15.50# J-55 Range 2 Casing. 6000 feet new 4.7# J-55 EUE Range 2 Tubing, to be sold with complete drilling rig equipped with Lee C. Moore mast, Oilwell 64B drawworks, hydramatic brake, two NKU Waukesha engines, direct drive rotary with WAK Waukesha and torque converter, C-250 pump, Koehler light plant, Thompson shale shaker, Series 900 Sheaffer blow out preventer, 3 dog houses, 6000 feet 4½″ drill pipe, seven 6¼″ drill collars. All other equipment and appurtenances to make a complete rig, ready to drill. Located in North Texas.

**Box D-895, The Oil and Gas Journal, Tulsa, Oklahoma**

## EQUIPMENT FOR SALE

**FOR CABLE TOOLS**
**DEGEN PIPE AND SUPPLY CO.**
**Box 107, Red Fork Station, Tulsa, Oklahoma**

FOR SALE: 36-L Bucyrus-Erie Spudder, with L1-600 Cummins Diesel Engine, Unit skid mounted, 54′ steel telescoping mast, with catheads, 5″ to 7″ tools, new lines, steel dog house, 3 K.W. Diesel light plant, steel structure and floors. All equipment practically new. Will furnish inventory on request. J. C. Shaffer, Inc., P. O. Box 4365, Oklahoma City, Okla. Ph. 6-9905.

FOR SALE: Lapweld casing 2300′—5 $\frac{1}{16}$″—17#; 1000′ 6⅝″—17#; 300′—8¼″. Tubing 6000′ 2″—4½#; 3000′—¾″. Used—No. 1 condition. Also used H.P. screw gates, check valves, casing heads, anchor clamps, etc. in good as new condition. Davis McInturf, Pennsville, Ohio.

FOR SALE: Double Drum Wilson Well Servicing Machine with Pole, powered with 100 Horsepower Waukesha. With or without K B-7 International Truck. Write E. N. Brock, Box 125, Artesia, New Mexico. Phone 423-J.

FOR SALE—ROTARY DRILLING RIG—1 ALLIS-CHALMERS L90 Commercial Motor, and 3,500 ft. of Upset Tubing. Will sell separate. C. A. Griffith—901 Houston—Plainview, Tex. Phone 1119-J.

## EQUIPMENT FOR SALE

FOR SALE at Tallant, Oklahoma: One 8′ x 15′ welded horizontal tank, 3/16″ shell, ¼″ head, $350. Cities Service Oil—Patridge—Bartlesville, Oklahoma.

D-13000 Caterpillar power unit; 60 HP 900 RPM slipring motor 3/60/2300; 30 HP 1200 RPM slipring motor 3/60/220; 30 HP 900 RPM slipring motor 3/60/220; 200 AMP. Hobart welder, motor driven, 3/60/220. Phone or write Wesley Steinhoff, Council Grove, Kansas.

AVAILABLE for sale and immediate shipment line pipe, seamless and lapweld casing, tanks. Call or write Edco Pipe & Supply Company, Box 565, Drumright, Oklahoma.

**SLIGHTLY USED BOILERS**

3—B & W Type H-4 Stirling #12 water tube 250 HP 17,000# per hour at 150# pressure, complete with Sturtevant fans, controls and motors; electric switches, $CO_2$ machines, burners, stacks, main valves, safety valves. Also approximately 24,000 fire brick. Priced for quick sale.

**Box D-888**
**THE OIL AND GAS JOURNAL**
**Tulsa, Oklahoma**

## FOR SALE

| Quantity | Size | Approx. wall | Description |
|---|---|---|---|
| 300,000′ | 1½″ O.D. | .140″ | Recond. Seamless Tubing, P.E., 14′ & Over. |
| 75,000′ | 2″ O.D. | .145″ | 2.7# Recond. Seamless Tubing, P.E., 14′ & Over. |
| 150,000′ | 2¼″ O.D. | .140″ | Recond. Seamless Tubing, P.E., 14′ & Over. |
| 28,000′ | 2⅜″ O.D. | ..... | 4# Good Used Lapweld Range 1 Tubing with New 11½ V-Threads and Collars. |
| 5,000′ | 3″ O.D. | .300/.375″ | 9.7# Seamless Tubing, P.E., 23′-26′ Lengths. |
| 40,000′ | 3½″ O.D. | .145″ | Recond. Seamless, P.E., 14′ & Over. |
| 150,000′ | 4″ O.D. | .140/.160″ | Recond. Seamless, P.E., 14′ & Over. |
| 1,700′ | 5″ O.D. | .438/.563″ | 24.03# Seamless Tubing, 17′-25′ Lengths. |
| 2,800′ | 5½″ O.D. | ..... | 17# Good Used Lapweld T&C Range 1 Casing. |
| 7,000′ | 6⅝″ O.D. | ..... | 13# Good Used Lapweld T&C Range 1 Casing. |
| 8,000′ | 6⅝″ O.D. | ..... | 18.97# Good Grade Used Lapweld, Cleaned, Beveled Ends, 20′ Random Mill Lengths. |
| 2,500′ | 7″ O.D. | ..... | 17# Good Used Lapweld Range 1 T&C Casing, 11½ V-Threads. |
| 5,000′ | 8⅝″ O.D. | ..... | 25# Good Recond. Casing, T&C, 8 V-Threads, Range 1. |
| 1,200′ | 10¾″ O.D. | ..... | 32.75# Good Used Lapweld T&C Casing, Range 1, New 8 Rd. Thds. & 8″ Long Collars. |

THIS MATERIAL IS AVAILABLE FOR IMMEDIATE DELIVERY, SUBJECT TO PRIOR SALE.

OTHER SIZES OF LINE PIPE, SEAMLESS TUBING IN SUITABLE SUBSTITUTE SIZES FOR STANDARD PIPE (EXCELLENT FOR GAS, GATHERING AND FLOW LINES), CASING AND TUBING AVAILABLE FOR IMMEDIATE DELIVERY.
FOR FURTHER INFORMATION, WIRE OR PHONE AT ONCE

**A. J. STRUBEL, Broker**

**SIDney 1791 (Day Phone) HUDson 8152 (Night Phone) 4946 Murdoch, St. Louis, Mo.**

## EQUIPMENT FOR SALE

FOR SALE: Fred E. Cooper-Allis-Chalmers Model W Double Drum Skid Winch complete with mast frames and electric starting. Has only worked on two wells. Would make ideal rod and tubing machine for work up to 3000'. Write or call Buckeye Supply Company, Zanesville, Ohio.

FOR SALE, Auto Car. 7½ ton truck, year 1942, Model C9064, Motor No. 60-2006, Tandem drive, with ten 1100 x 24 tires and Spare tire. Over all length of truck 31 feet, over all width 8 feet. Equipped with 50 ton Braden winch, and flat body with rolling tail gate. Size of body length 18 feet 6 inches, width 8 feet. Progress Iron & Steel Co., 117 East Market St., Louisville, Kentucky.

FOR SALE: Fred E. Cooper-Allis-Chalmers Model E Double Drum Winch Tractor complete with 8⅝" x 7" O.D. 55' mast, dual rear wheels, cross arm spudder and electric starting. Would be ideal for clean out work or pipe pulling. Write or call Buckeye Supply Company, Zanesville, Ohio.

FOR SALE: Two Sullivan 37 special rigs mounted on International trucks, Waukesha and Buda drill motors, 1800 ft. Sullivan 2⅜ tool joint pipe 20 ft., two 900 gallon water tanks mounted on late model Chevrolet trucks, two 4 wheel rod trailers, two 260 gallon gasoline trailers. Equipment in top shape, used less than two years. Nothing additional needed to start drilling. Good supply extra parts. TRANS-TEX EXPLORATION CO. Box 558, Abilene, Texas. Phones 8130—2-7565.

International Diesel UD-24, MFR. Rating 165 hp., develops 200. Practically new. For sale $5,000.00 complete. Samuel Richeson, Potosi, Missouri.

FOR SALE: 40 H.P. Bettis steamer, Tanks and steamer cab, Tools, Conns, Steam hose. On 1948 2-Ton Chevrolet truck. Price $3500.00. Frank Jones, McPherson, Kansas.

ONE heavy duty Maphey Type B Measuring Reel with weight indicator, driven by gasoline engine, mounted on four wheel trailer. Box 11054, Ft. Worth, Texas.

**Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.**

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FOR SALE: Two Mayhew 1000 shothole drills, mounted on all-wheel drive, Wheatley 6 x 6 pumps, 500 feet drill pipe, 1000 gallon water tank trucks. Box D-901, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Patented Gas Lift for flowing or pumping wells, successfully used for a number of years. This would be an excellent proposition for Petroleum Engineers, or Production Men with practical experience. Will sell for cash, or might consider good producing royalty, or settled production. Box D-893, The Oil and Gas Journal, Tulsa, Oklahoma.

ASKANIA MAGNETOMETER for Sale: Box D-900, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: FAILING 1000 model and Franks Model F—for sale or for contract drilling. Reply Box D-899, The Oil and Gas Journal, Tulsa, Oklahoma.

## EQUIPMENT WANTED

WANTED: 7¼ x 10 Gardner-Denver Slush Pump. Box D-902, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Used Bucyrus-Erie Spudders, sizes 24-L, 28-L and 26-L, Less tools. Write giving all details as to age, condition, location and price. Buckeye Supply Company, Zanesville, Ohio.

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## EQUIPMENT WANTED

WANTED—Large or small spudder, with or without equipment; give age, condition, price. C. A. McMillen, 117 East Main St., Titusville, Pa.

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WANTED TO BUY: Seven inch hydraulic Casing Pulling Jacks with spiders. FOR SALE: Cardwell single drum, well service unit. Spools 10,000—¾" wire line. Box 4387, Oklahoma City, Okla.

## HELP WANTED

WANTED: Associate or full professor of Petroleum Engineering in a leading institution. Must have successful professional and research background. Work to begin September fifteenth. Box D-897, The Oil and Gas Journal, Tulsa, Oklahoma.

FOREIGN and Domestic Oil Employment Directory covering the oil industry, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla.

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Independent oil producing company with small refinery desires employ experienced oil accountant as assistant controller. Furnish full details as to experience, education, marital status, age, salary desired, references, etc., in first reply. References will not be contacted until interview granted. Answer by letter only. Address reply to:

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ELECTRICAL ENGINEER: New large oil pipeline company requires electrical engineer to handle design, construction and devise maintenance procedures, all classes equipment to 5-KV switch gear. Some familiarity with sub-stations to 110-KV, 5000-KVA desirable but not required. No communications or electronics involved. Include full professional and personal details and minimum salary, first letter. Job is permanent. Box D-761, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, experienced, 10 years or more, for employment in South Texas by independent operators. State age, family status and qualifications. Box D-883, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED GEOLOGIST qualified for geological work in connection with reservoir engineering. Five years experience necessary. Experience in Permian Basin desirable. Box D-857, The Oil and Gas Journal, Tulsa, Oklahoma.

### SITUATIONS WANTED

EXPERIENCED PETROLEUM GEOLOGIST Single, Draft-exempt. Nine years major company experience, four years independent geological experience. Specialist in all phases subsurface and well work. Opportunity for advancement important. Location—open. Box D-874, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING Contractor operating in West Texas and New Mexico desires to contact small or medium-sized independent oil company who needs an operating manager. Personal interview desired. Twenty years experience in all phases of the oil industry. Address replies to Box D-644, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

PETROLEUM GEOLOGIST, ten years varied experience desires responsible position in Rocky Mountains or Foreign. Presently employed; speak four languages. Box D-879, The Oil and Gas Journal, Tulsa, Oklahoma.

PIPE LINE corrosion and communications engineer with ten years experience will consider another position. Box D-884, The Oil and Gas Journal, Tulsa, Oklahoma.

BSME, 37 months oil field service engineer desires opportunity with a progressive independent doing secondary recovery. Box D-878, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER—PRODUCTION SUPERINTENDENT: 23 years experience in drilling and production operations; 12 years experience general production engineering; supervisory experience completion and workover operations. Desire connection with independent operator. Box D-896, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER - GEOLOGIST—Age 32, six years with Major and Independent companies, all phases production and development engineering. Desires position as Geological or Production Engineer with substantial independent oil company, Calif. or Mid-Continent area. 30 days notice. Reply Box D-898, The Oil and Gas Journal.

PETROLEUM ENGINEER: Married, 32, graduate of the University of Tulsa, one year petroleum production experience. Will consider any petroleum engineering position offering opportunity for advancement. Box D-894, The Oil and Gas Journal, Tulsa, Oklahoma.

### SITUATIONS WANTED

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### PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

### FOR SALE—MAPS

JOHNSON COUNTY, Texas, magnetic map just being completed, exclusive rights for sale. Reed Magnetic Surveys, 1316 East 26th Place, Tulsa 5, Oklahoma. Phone 7-9429.

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# EQUIPMENT MEN

*(Continued from page 249)*

## Baash-Ross Names Laird California Sales Manager

Baash-Ross Tool Co. has announced that Lee Laird has recently been made California sales manager for the company.

Laird has been associated with the oil industry for more than 22 years. In 1934 he joined the sales staff of Chiksan Co. which he left, after becoming vice president and general sales manager, to devote full time to his own company, Gil-Lair Products Corp.

Laird will make his headquarters at the main Los Angeles plant of Baash-Ross Tool Co.

## Bellows Co. Broadens Pacific Coast Activities

Establishment of West Coast regional headquarters at Los Angeles, has been announced by The Bellows Co., Akron, manufacturers of Bellows controlled air power devices for industrial use.

George Cook, formerly of Conapco, Inc., will act as West Coast regional manager. The new regional headquarters will direct the sales and service activities of Bellows field engineers serving the industrial areas of Los Angeles, San Francisco, Spokane, Portland, and Seattle.

According to the announcement by H. B. Link, executive vice president of Bellows, the company will also take over all distribution sales activities for Smith-Johnson Corp., Los Angeles, manufacturers of Senacon pneumatic equipment, formerly handled by Conapco, Inc.

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## Rockwell Elects L. A. Dixon as Director

L. A. Dixon was elected a director of Rockwell Manufacturing Co. at the recent board meeting. He has been a vice president of Rockwell's Meter and Valve Division since early 1948, and before that was president of Pittsburgh-DuBois Co., manufacturers of tin gas meters, which is now a division of the Rockwell firm.

## Eastman Will Represent Globe Oil Tools in Canada

Officials of Globe Oil Tools, Co., Los Nietos, Calif., and Eastman International Co., Denver, have announced the appointment of Eastman Oil Well Survey Co., Ltd., of Calgary, Alta., Canada, as Globe representative in Canada.

Eastman will distribute the Globe 2-Cutter geophysical rock bit and the Globe junk catcher. It will maintain complete stocks for distribution in all Canadian fields, from its warehouse at Edmonton and in Calgary where it also has its main office.

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## research

Since Refinery Supply Company opened its doors in 1918, it has been a leader in developing highly specialized types of scientific apparatus. During this same year the founder, W. A. Schlueter, applied for patents covering the first control application ever designed for vapor outlet control towers. Today this has become the principal control application in petroleum refining. As in 1918, the Refinery Supply Company is still a pioneer in the field of research for better methods in the petroleum industry.

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XUM

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Rock
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